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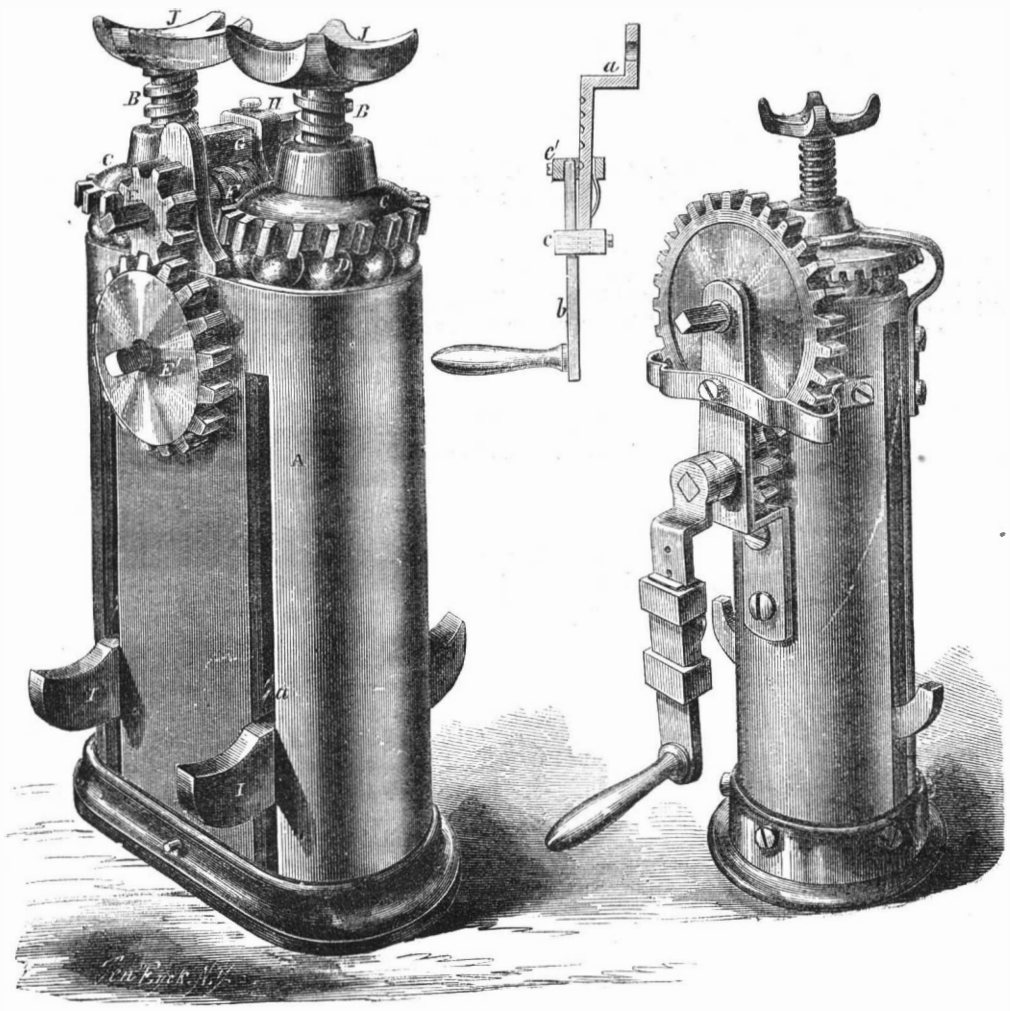
## Improved Screw Jack.

In all mechanical operations it is necessary to have some convenient power always at hand wherewith to handle heavy masses of iron or stone; either for the purpose of changing the position of the work, or to place it in its final destination. To this end, hydraulic pumps, screw jacks, cranes, and other devices of a similar nature have been invented, and are in extensive use. Herewith we illustrate an improved form of screw-jack which possesses by reason of its combination, extraordinary features of excellence. Fig. 1, consists of the oval cast-iron box, A, to which are fitted the two screws, B B; these screws are worked by the gears, C C; the gears have threads in their centers through which the screws work; on the under side of the gears there is a groove in which the balls, D, revolve as the wheel is turned. The wheels are revolved by applying the handle seen in Fig. 3, to the squared end of the shaft, E; this is a continuation of the worm or endless screw shown at F; its operation is familiar to all mechanics. The cross-bar, G, has a strap, H, bolted to it, whose ends project over and nearly touch the crown wheels; this keeps the screws from being bent apart by any indirect strain upon them. There are two wrought iron feet, I, projecting on either side of the case at the bottom; these feet are attached by a nut to the base of the elevating screw and follow up with it; there are also two friction rollers or wheels, *a*, which run upon the inside of the case, and prevent the screw from binding or being bent. The single jack, Fig. 2, is similar in principle to the double one; the only difference is in the manner in which the screw gear is worked. In the single jack it is driven by a bevel gear, and in the double one there is a worm, as before mentioned. The handle, shown in Fig. 3, is also an ingenious piece of mechanism; it consists of two parts, the handle proper, *a*, and the slide, *b*, to which the grip is affixed, these are connected by two straps, *c c'*; there is, moreover, a small pin in *c'*, which fits into a corresponding hole, one of a series made at intervals in the handles. When the pin is sprung out of the hole, the two parts may be slid past each other until the length is deemed sufficient; by this arrangement the leverage applied to the wheels is considerably augmented, and can be graduated at pleasure.

Fig. 1 Fig. 3 Fig. 2



LANDIS'S PATENT SCREW JACK.

The advantages of this jack are manifold; the operation of it is so plain that we will not delay our readers by dwelling on matters with which they are already familiar. The old-fashioned screw jacks have merely a squared head under the swivel, J, to which force was applied by inserting a bar in holes there provided; the strength of the workman and the length of the lever were the only advantages, besides the screw, obtained in the machine. In this screw jack, however, we have a combination of the most powerful mechanical agents so disposed as to produce excellent results. When the handle is applied to the shaft, E, the great diameter of the wheel on it, compared with the pinion, causes the latter to revolve and run up the screws swiftly; if, however, we change the handle to the pinion shaft, we have a slower motion, but are able to exert a much greater force on the screws. The single jack has no worm shaft, but what it loses in this respect, is fully recovered by the additional pinion to which the handle is attached. This screw jack among other uses, is employed in hoisting buildings, for moving or for repairing their foundations, and for all mechanical purposes where such tools are generally used. The inventor states that he has employed them to great advantage in a cider mill, in squeezing the juice out of the pomace. We have no hesitation in recommending this jack as one of the best and most powerful of the screw variety that we have ever seen; it is the invention of Israel L. Landis, and was patented on Jan. 7, 1862; further information can be had by addressing the inventor, Box 405, Lancaster, Pa.

## The Tax Bill Amendment.

By the provisions of the amended tax bill, recently passed by Congress, we notice that the following trades, callings and professions, are taxed at the rates which are appended to their several businesses. Owners of steam engines—marine, locomotive or otherwise—3 per cent ad valorem. Architects and engineers—civil and mechanical—who are engaged in constructing (not operating) lines of railway, ships, factories and machinery, each $10, as a license fee. Shoemakers making custom work, though not for sale generally, amounting in value to $1,000 per annum, are mulcted 1 per cent. Iron castings $1 50 per tun. Smoking tobacco 5 cents per pound. Snuff 20 cents per pound. Iron manufactured into horse-shoes, rivets, railroad iron, &c., where the duty on the raw material has been actually paid, 50 cents per tun. Builders $25 license fee. Hackney coachmen $3 license fee. Retail dealers $10, and liquor-sellers (retailers) $20; and so on through a long list, the most important of which we have given above.

We have omitted one very important subject, however—that of the hooped skirt business. As this directly affects the interests of the ladies, the committee have done wisely in permitting all material for the manufacture of crinoline to go free of any tax. The fair portion of the community need not dread any retrenchment of their circumference; the gallantry of the Congressional committee has spared them this mortification.

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THREE locomotives built for the Government were sent off from Taunton on the 16th ult. Two of them were constructed at Mr. Mason's shop, and were named "Gen. Burnside" and "Gen. Sickles." The other was made at the Taunton Locomotive Works, and is named "W. A. Murfey."

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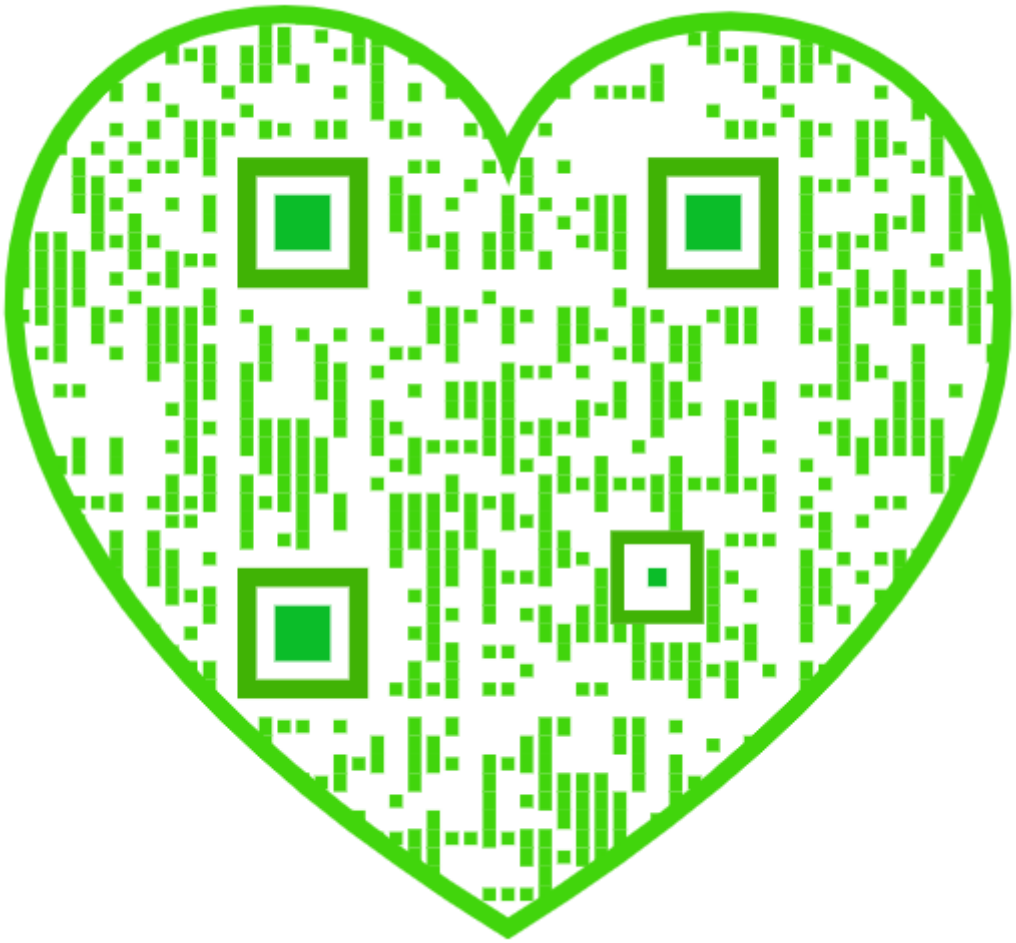

### Incombustible Dresses and the Treatment of Burns.

The following useful information is condensed from the London *Chemist and Druggist*:—"The best agent for rendering muslin incombustible is *tungstate of soda*; the fabrics being immersed in a solution of one pound of this salt in a gallon of water, or in a still stronger solution, if the article requires to be tightly "wrung" before drying. Dresses, &c., to be starched, may be immersed in a stiffening mixture prepared from starch, to which about one-fourth or one-third of its weight of tungstate of soda has been added. A 10 per cent solution of sulphate of ammonia has also been recommended as an anti-inflammable liquid, and it succeeds very well, but articles prepared with it cannot be ironed with facility. F. Versmann, of Bury-court, London, showed tungstate of soda and a starch prepared with it at the International Exhibition. Solutions of borax, chloride of zinc, phosphate of ammonia, alum and sal ammoniac may be employed with more or less success for fire-proofing.

The recent cases of severe burning have called forth some useful hints from medical men as to the treatment of burns. Mr. Frank T. Buckland makes the following practical remarks in the London *Times*:—"Opiates are excellent things, and should be given for the sake of relieving pain; but the stimulants must not be forgotton. The shock of the burns depresses the whole system most terribly, and laudanum, though it relieves the pain, is also depressing in its effects. I would therefore (as in accidents of this kind time is most precious) recommend the following mixture to be given at once:—Laudanum, 30 drops; sulphuric æther, 40 drops; brandy, a tablespoonful, in a wine-glass full of warm water. This should be given directly, and repeated in an hour's time if the pain is not subdued. This treatment should be followed up by beef tea and other concentrated forms of nourishment. Of course, the ever-present remedy of covering the burns freely with flour from a flour-dredge and applying cotton wool above the layer of flour must not be neglected, and should be put in force till the medical man arrives."

A correspondent, signing himself "F. C. S," describes some of the marvelous cures effected by an extremely simple remedy, namely, common whiting (washed chalk), the domestic polishing material that is to be found in every kitchen. "F. C. S." boldly avers that this simple remedy exceeds all others, and he professes to have had thirty years' experience of it. From his amusing letter we make a few extracts:—

"Than myself I believe there are few with constitutionally a more susceptible cuticle, and still fewer whose earlier avocations were attended with more of the burns and scalds that are incident to the working members of the profession to which I have the honor to belong. In short, since I have been able to make a crucible red-hot in a kitchen fire, I have had as many mishaps of this character as most chemists; but, thanks to my early acquaintance with the virtues of whiting, I have generally got over them with comparative impunity—mostly, indeed, without a blister, but always without leaving unseemly marks behind. At the same time, much, if not all, depends on the immediateness of the application."

With respect to the mode of applying the remedy he gives the following information:—

"It ought to be applied moist, immediately after the accident, and it should be kept so for a few hours. The substance itself requires no renewal, all that is necessary being to keep it moistened with a wet sponge until the pain has subsided, which, unless in very severe cases indeed, is not long. When a limb is much injured, or the body, I have known a bath of it to have a most salutary effect."

The value of chalk as a remedy has since been insisted on by "A Retired F.R.C.S.," who states that he had used a paint composed of chalk, linseed oil and vinegar, in cases of burns and scalds, both in hospital and private practice, for forty years. He first saw the paint used by an old woman, and discovered its ingredients by analysis. His form for the paint and general directions for treatment of burns are given as follows:—

"Take chalk and linseed or common olive oil, and mix them in such proportions as will produce a compound as thick as thin honey; then add vinegar so as to reduce it to the thickness of treacle; apply with a soft brush or feather, and renew the application from time to time. Each renewal brings fresh relief, and a most grateful coolness. If the injury is severe, especially if it involves the chest, give ten drops of laudanum to an adult, and repeat it in an hour and again a third time. To a child of ten years give in like manner only three drops; and beware of giving any to an infant. This plan, with an internal stimulant according to age, as brandy or sal volatile, or both, should be at once adopted, and there need be no impatience for the arrival of the often-distant doctor; neither do I advise submission to any change in the plan as regards the chalk paint when he may arrive, for I am quite sure that the College of Surgeons cannot improve it."

### A Battle between Ants.

"Walden," by the late Henry D. Thoreau, contains in the chapter entitled "Brute Neighbors," the following account of an ant fight:—

"I was witness to events of a less peaceful character. One day, when I went out to my wood-pile, or rather to my pile of stumps, I observed two ants—the one red, the other much larger, nearly half an inch long, and black—fiercely contending with each other. Having once got hold, they never let go, but struggled and wrestled and rolled on the chips incessantly. Looking farther, I was surprised to find that the chips were covered with such combatants, that it was not a *duellum*, but a *bellum*, a war between two races of ants, the red always pitted against the black, and frequently two reds to one black. The legions of these myrmidons covered all the hills and vales in my wood-yard, and the ground was already strewn with the dead and dying, both red and black. It was the first battle which I had ever witnessed—the first battle-field I ever trod while the battle was raging—internecine war; the red republicans on the one hand, and the black imperialists on the other. On every side they were engaged in deadly combat, yet without any noise that I could hear, and human soldiers never fought so resolutely. I watched a couple that were fast locked in each other's embraces, in a little sunny valley amid the chips, now at noon-day, prepared to fight until the sun went down, or life went out. The smaller red champion had fastened himself like a vice to his adversary's front, and through all the tumbling on that field never for an instant ceased to gnaw at one of the black one's feelers near the root, having already caused the other to go by the board; while the stronger black one dashed him from side to side, and, as I saw on looking nearer, had already divested him of several of his members. The fought with more pertinacity than bull-dogs. Neither manifested the least disposition to retreat. It was evident that their battle-cry was conquer or die. In the meanwhile, there came along a single red ant on the hillside of this valley, evidently full of excitement, who either had dispatched his foe, or had not yet taken part in the battle—probably the latter, for he had lost none of his limbs—whose mother had charged him to return *with* his shield or *upon* it. Or perchance he was some Achilles, who had nourished his wrath apart, and had now come to avenge or rescue his Patroclus. He saw the unequal combat from afar—for the blacks were nearly twice the size of the reds—he drew near with rapid pace till he stood on his guard within half an inch of the combatants; then, watching his opportunity, he sprang upon the black warrior, and commenced his operations near the root of his right fore-leg, leaving the foe to select among his own members; and so there were three united for life, as if a new kind of attraction had been invented, which put all other locks and cements to shame. I should not have wondered by this time to find that they had their respective musical bands stationed on some eminent chip, and playing their national airs the while, to excite the slow and cheer the dying combatants. I was myself excited somewhat, even as if they had been men. The more you think of it, the less the difference. And certainly there is not the fight recorded in Concord history, at least, if in the history of America, that will bear a moment's comparison with this, whether for the numbers engaged in it, or for the patriotism and heroism displayed. For numbers and for carnage, it was an Austerlitz or Dresden. Concord fight! Two killed on the patriots' side, and Luther Blanchard wounded! Why here every ant was a Buttrick—'Fire! for God's sake fire!'—and thousands shared the fate of Davis and Hosmer. There was not one hireling there. I have no doubt that it was a principle they fought for, as much as our ancestors, and not to avoid a three-penny tax on their tea; and the result of this battle will be as important and memorable to those whom it concerns, as those of the battle of Bunker Hill at least.

"I took up the chip on which the three I have particularly described were struggling, carried it into my house, and placed it under a tumbler on my window-sill, in order to see the issue. Holding a microscope to the first-mentioned red ant, I saw that, though he was assiduously gnawing at the near fore-leg, having severed his remaining feeler, his own breast was all torn away, exposing what vitals he had there to the jaws of the black warrior, whose breast plate was apparently too thick for him to pierce; and the dark carbuncles of the sufferer's eyes shone with ferocity such as war only could excite. They struggled half an hour longer under the tumbler, and when I looked again the black soldier had severed the heads of his foes from their bodies, and the still living heads were hanging on either side of him like ghastly trophies at his saddle-bow, apparently as firmly fastenened as ever, and he was endeavoring with feeble struggles, being without feelers, and with only the remnant of a leg, and I know not how many other wounds, to divest himself of them; which at length, after half an hour more, he accomplished. I raised the glass, and he went off over the window-sill in that crippled state. Whether he finally survived that combat, and spent the remainder of his days in some Hotel des Invalides, I do not know; but I thought that his industry would not be worth much thereafter. I never learned which party was victorious, nor the cause of the war; but I felt for the rest of that day as if I had had my feelings excited and harrowed by witnessing the struggle, the ferocity and carnage of a human battle before my door."

### The First Cotton Manufactory in New England.

The *Commercial Bulletin* (Boston) gives the following account of the first cotton manufactory at Beverly, Mass.:—

"The manufactory was erected in 1788, at the 'Second Parish,' now known as North Beverly. The building was of brick, and contained fourteen looms, which were operated by as many men, some of whom came from Scotland and Ireland, acting as teachers. The carding machines were capable of carding about forty pounds of cotton per day. There were also about ten rude spinning jennies, with an average of about seventy spindles. Some of these were operated in the factory, while others were distributed among the families of the neighborhood. The machinery was made in the place, and must have been extremely rude, compared with modern improvements. The cotton used was the Sea Island, and an inferior article from the West Indies and from India. Slater's Mill, in Pawtucket. R. I., was commenced two years afterwards, and proved to be the first successful water mill for cotton in the United States. At Beverly the carding was done by hand at first, but very soon horse-power was introduced."

### What One Shell can Do.

The steamer *Mercedita*, which recently arrived at Philadelphia, from Port Royal, requires repairs to to her engine and hull, caused by damages from collision with the ram *Palmetto State*, off the harbor of Charleston. About thirty feet of her side will have to be taken out. Seven planks and two timbers were stove in by the ram's prow, making a hole five feet vertically and three feet horizontally. A shell of one hundred pounds weight passed through the ship, cutting one man in two, and by going through the steam chimney, three men were scalded to death, three others badly scalded and a number slightly. It passed out the port side, destroying six planks and two timbers, making a clear hole three feet by two and a half feet and shattering the planks eight or nine feet further. The shell exploded as it passed out. It is the opinion of the steamer's officers that, had there been a swell of the sea at the time, she must have gone to the bottom like a stone.

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### French Railway Humanities.

The Orleans railway is an illustration of the fostering policy which distinguishes the French Government, —it exercises over the large numbers of persons it employs in its service a sort of paternal care, which is quite singular, both in its character and consequences. To M. Polonceau, the chief engineer of the company, is due the credit of the arrangement. He devised, not long since, a plan by which the food, the clothes and the health of every person employed on his line should be systematically cared for, and at the least possible cost. We know that, in this country, the incessant labors of the people employed upon our railways allow them but little time to look after families, their comforts and their health. Engineers, conductors and firemen, for example, seldom pass more than a few hours in a week at home. They are continually on the wing; and even among the workmen at the engine-houses and machine-shops there is an incessant "sound of hammers closing rivets up." It would seem impossible for these persons to have much leisure or repose, and though the compensation of a large salary sweetens the heaviest labor, it does not free the possessor from many anxious cares.

On the Orleans railway, then, we find at the principal stations, a medical man with well-prepared offices, whose business it is, not only to give his immediate services in case of accidents, but his advice and attention to all those employes and their families who are merely unwell. Medicines are administered and every possible attention is paid to the sick. Workmen injured in the service of the company receive full pay until their restoration to health, and the ordinary sick are allowed forty cents per day. So liberal is this arrangement that in a single year (1858) 2,500 persons were under the care of the medical staff, of whom 1,900 were not workmen, but members of their families, and the cost of the medicines used was three thousand dollars.

In connection with this, another step was taken. Committees composed of the superior officers of the company were formed for the purpose of visiting the homes of the workmen, and money and goods were bestowed on their families as deemed advisable. In the winter of 1857-'58, 1,243 families were visited and relieved by the committees to the extent of $10,000, and the moral effect of this supervising benevolence is seen and felt in its influence on the railway employes themselves.

At each station is a clothing and food depot, where those articles are sold to the workmen and their families at the cost price, or nearly so. By this escape from the profits of middlemen and hucksters, the men save nearly 75 per cent on articles of prime necessity, and of course live much more cheaply than working men of other classes. Each employe is allowed a monthly credit at these depots in proportion to the amount of his wages, and the accounts ere accurately kept. These depots are constantly supplied with the best articles. In 1857, the latest year of which we have an account, two hundred thousand dollars was the cost of food so supplied, and forty-five thousand dollars that of clothing. No one is compelled to use these credits, or buy, unless he chooses. At Ivry, the Paris station, there is a refectory for the use of the railway people, open from morning till night, where an excellent meal is provided, including bread and wine, at a cost of ten cents. For two cents, one may have 3 ounces of bread and 15 ounces of soup, both of an excellent quality. A dinner consisting of soup, two dishes of meat, a dish of vegetables and a half a pint of wine can be had for 11 cents.

This last arrangement—providing the workmen with cheap and nourishing food—is said to have entirely changed the habits of the Orleans railway servants. They have forsaken their former pothouse way of life, and their families have gained largely by the change.

In this country it is very doubtful whether it would be possible to carry out the benevolence of the Orleans plan, owing to the great difference in the tempers and opinions of our working people. Each man in this country is deemed competent to take care of himself—he generally prefers to do so; and even benevolence, if obtrusive, is rejected by very large classes of those who are in need.

The nearest approach to the French system, that we can call to mind among ourselves, is the establishment of a refectory at the milk depot of the Harlem railroad. There, in warm and comfortable rooms, a good meal may be obtained at cost by those hard-working men who, in the early morning, await there the arrival of the milk trains, and who, amidst snow and storm and often darkness, dispense throughout our large city the inestimable blessings of a pure, fresh, and wholesome [?] beverage.—*American Railroad Journal.*

### RECENT CHANGES IN THE PATENT LAW.

The patent law as it stood required applicants to pay a fee of $15 on filing their applications, and after that, in case the Commissioner decided to grant a patent, a further fee of $20. No particular time, however, was specified for the payment of the last installment; and applicants have been in the habit of allowing their cases to remain incompleted as long as they pleased, and in such great numbers that the Patent Office has been much incommoded by the practice. During the last hours of the late Congress an amendment was adopted, which requires that the second installment of $20 shall be paid within six months after the decision; and if the applicant fails to make such payment, no patent can issue, and *the invention becomes the property of the public.* All inventors should remember this; and those who now have applications pending on which the fees have not been paid up, should see to it that the money is promptly remitted.

Congress also passed another amendment by which the renewal of the oath, after a rejection, is done away with. This was always a useless and troublesome requirement. We have long advocated its suppression, and are glad that a law to that effect has been adopted.

### Decrease of Population in Europe.

Population in any country has a tendency to increase more rapidly than the means of subsistence can increase. Population doubles in twenty or twenty-five years. Subsistence (unless under very extraordinary circumstances) will not increase in anything like this ratio. The disproportion must be kept down, either by increase of deaths or by a diminution in the amount of subsistence enjoyed by each individual, or by diminution of births through fewer and later marriages, or by emigration. Ever since the commencement of the potato disease in 1845, if not a little earlier, there has been a very marked diminution in the rate at which population has advanced in Western Europe. In France the rate of increase was estimated at 0.646 per annum from 1801 to 1836; at 0.445 from 1836 to 1856, and is now less. In Western Germany there has been an extremely slow increase in most parts, an actual diminution in others—Electoral and Grand Ducal Hesse. In Great Britain the population, since the census of 1841, has increased no faster than that of France. That of Ireland has greatly diminished. That of Scotland has scarcely increased at all. The whole increase is in England and Wales, and generally speaking in the towns and manufacturing districts. To take the case of England and Wales alone; these had 18,000,000 of inhabitants in 1851, 20,000,000 in 1861; but it must be remembered that England draws constantly increasing supplies of people from other parts; the whole 2,000,000, therefore, cannot be set down as the natural increase.

### The Pyramids of Egypt.

The purpose for which those colossal monuments were erected has always been a subject of dispute among archæologists. Were they the tombs of kings, or observatories, or sun-dials? Were they erected as barriers against the sands of the desert, or were they mere granaries? Sir J. Herschel, having remarked their orientation to the four cardinal points and the uniform inclination of their entrances at an angle of from 26 to 27 degrees, expressed a belief that they pointed towards some star in Draco, which four thousand years ago must have been at a distance of only three or four degrees from the North Star, and therefore on the axis of the vaulted entrances. Mahmoud Bey, astronomer to the Viceroy of Egypt, now explains the matter in rather a novel manner. In his opinion, founded on personal observation, the pyramids were devoted to a divinity having Sirius, or the Dog-star, for its emblem. Among the ancient Egyptians the stars were the souls of innumerable divinities emanating from Ammon Ra, the Supreme Being. Sirius represented the dog-of-the-heavens, Sothis, who judged the dead, so that it was perfectly rational to devote the pyramids, considered as tombs, to the star Sirius.

### Manchester Manufactures.

The following tables were lately published in Manchester, as showing the exports of cotton goods from that city for three years. The decline in 1862 shows the almost utter prostration of business in that city:—

| | | *Calicoes.* | *Yarns.* |
|---|---|---|---|
| India, | 1860, | 722,828,446 yds. | 27,344,571 lbs. |
| " | 1861, | 735,549,267 " | 22,897,511 " |
| " | 1862, | 459,020,796 " | 15,072,539 " |
| China, | 1860, | 222,963,780 " | 8,764,030 " |
| " | 1861, | 243,654,141 " | 6,733,914 " |
| " | 1862, | 79,883,810 " | 3,314,059 " |

The total exports to all markets to the 1st of December in each of the years named were:—

| | *Calicoes.* | *Yarns.* |
|---|---|---|
| 1860, - - | 2,696,009,294 yds. | 197,130,027 lbs. |
| 1861, - - - | 2,680,229,181 " | 175,521,057 " |
| 1862, - - | 1,768,763,823 " | 98,234,099 " |

Comparing the exports of the last three months of 1862 with the same periods of 1860 and 1861, the decline is much more remarkable. The return for December last has not been issued, but the return for the previous month (November, 1862,) of the exports of cotton manufactures of all kinds is 79,260,822 yards, against 238,287,637, or about one-third. In value (owing to the rise of prices) the difference is not very great, the exports for the eleven months ending November, 1862, being £35,486,877, while in the corresponding eleven months of 1860 it was £36,-102,681.

### Advantages of American Coal Mines.

The bituminous coal fields of the Alleghany range are most favorably situated for mining purposes. The strata have been elevated, but there is little tilting—they lie in nearly a horizontal position. This gives great advantage in mining, as there is little trouble with drainage, there being just about dip enough to effect this object. The whole of the Cumberland coalfield is all within the waters of the Potomac. The north branch of the Potomac heads west, and passes through the coal by a gap of nearly a mile wide, having six seams of coal, two beds of iron ore, and one of limestone, lying one above another in a hight of about 900 feet. In one respect this field resembles a coal-field in Wales, where coal, limestone and iron ore are all obtained from one mine, and where some of the largest iron works in Great Britain are found. There is this difference, and it is very important one, that here the materials are none of them to be elevated, but can all be obtained by a level or descending conveyance; there they all have to be raised from a great depth. In this region coal can be raised more readily than almost anywhere else, the river passes through the beds, and the streams that rise in the valley above the coal have exposed the runs in various places, so that the miners can commence their operations in the light of day and on a level with the surface.

A SPICY SUBSTITUTE FOR CENTS.—Owing to the scarcity of "small change," the grocers of New Haven (Conn.) are issuing nutmegs [wooden ones?] representing one cent each, to their customers. We suggest that, for "coin of greater growth," they should issue *nutmeg-graters.*

THE Acclimatation Society of Australia has sent to Europe for as many sparrows as can be procured. Caterpillars and other insects commit great ravages on vegetation in Australia, and it is expected that those birds will afford effectual means for the destruction of these pests.

BLACK INK POWDER.—Sulphate of iron, two parts; galls, five parts; gum, one part. Reduce to a powder and divide into one-ounce papers, each of which will make half-a-pint of ink.

ABOUT $300,000 of the treasure lost in the California steamer *Golden Gate* has been recovered, and it is expected that about one million dollars altogether will yet be secured.

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## NATURAL COLORED PHOTOGRAPHS.

The celebrated French chemist, Mr. Niepce De Saint Victor, has been for many years devoting himself to experimental heliochromy, for the purpose of discovering the art of taking fixed photographs in their natural colors. He has lately presented his fifth memoir on the subject to the Academy of Sciences, Paris. The following are some extracts from it :—

"I have always found yellow the color most difficult to obtain in the same space of time as the other tints; but I have recently discovered the means of developing it with certainty, and of obtaining it in the same time as other colors. I had previously obtained, with great facility, red, green, and blue; I have arrived at obtaining yellow, by employing as an agent for chloridizing my plates, a bath composed of hypochlorite of soda, in preference to the hypochlorite of potassa. This bath must be in the following conditions :—Take newly-prepared hypochlorite of soda, marking six degrees of the areometer; dilute it with one-half its bulk of water, and then add alcohol in quantity equal to ½ per cent of the soda, and heat the bath to a temperature of 180° to 190° Fah. ; then pour it into a flat capsule, half-plate size, stirring the liquid for a few seconds, immerse the plate in it at once, a time sufficient for the plate to take a black tint. It is then rinsed in abundance of water, and dried over a spirit-lamp. In 200 grammes (6¼ oz) of this bath we can chloridize five or six quarter-plates, among which some will give better results than others, according to the thickness of the film and the degree to which the plate has been heated. In these conditions of chloridization the colors are produced (especially by contact) with very vivid tints, and very frequently the blacks appear in their full intensity. To operate in the camera obscura, we select plates which, by the action of heat, have received a fine cherry-red tint, as well as those which are more slightly reheated, because they are the most sensitive to light. On this account the film of chloride of silver must not be too thick. But, to obtain the effects which I now describe, the chloridized plate must be covered with a varnish with a base of chloride of lead.

"With regard to the problem of fixing the colors, I have only succeeded in doubling the time of duration announced in my last report. Many substances, added after the action of heat upon the chloride of lead, give a greater fixity than if the chloride of lead was alone; such are, among others, the tincture of benzoin, chloride of tin, and aldehyde. But what has given me the best result is the tincture of Siamese benzoin, applied to the plate while it is yet warm, and, after the plate has become dry, heating it until a little of the benzoic acid is volatilized. It is by means of this lead varnish that I have been enabled to preserve colors during three or four days, in an apartment strongly illuminated by daylight, in the month of July. If we incline a heliochromic image, at a certain degree of incidence, the colors appear much more vivid, and the blacks assume the greatest intensity. I have also remarked that, according to the manner in which the figure of a doll (which I used) is illuminated by the solar rays, the obtaining the colors in the camera obscura becomes singularly modified, and produces very advantageous effects as to intensity of color and brilliancy; as, for example, gold and silver lace, precious stones, &c. But what is very extraordinary, is that, having placed a strip of unglazed black paper upon a large piece of silver lace, which the figure wore as a belt, the black of the paper was reproduced with the white of the silver lace. Black is reproduced with a violet hue, viewed direct; but, if the plate be inclined at a certain angle, it assumes its greatest intensity, and the silver lace its metallic splendor. Light, in changing the heliochromic colors made in certain cases, changes green into blue, and yellow into green; as, for instance, if we cover them with a varnish having chloride of tin for a base, which, moreover, greatly retards the activity of the light; if it had not this objection, it would serve as a temporary fixing agent, for the reds are preserved a very long time.

"I have proved that all the binary colors are decomposed by heliochromy. If the green be natural, like that of the emerald, arsenite of copper, oxide of chrome, sulphate of nickel, green carbonate of copper, they are reproduced green by heliochromy; but if the green be a compound, like that, for example, formed by a mixture of Prussian blue and chrome yellow, or that of stuffs dyed by means of a blue coloring material and a yellow, or of certain glasses colored by blue and yellow pigments, these greens, I repeat, give blue only by heliochromy, either by contact, or in the camera obscura. A light blue glass, superimposed upon a light green glass, give by transparency, a very fine green ; but, being applied to a heliochromic plate, they only produce blue ; whatever be the time of exposure to the light, or whether the blue glass be uppermost or below, the results are the same. Certain kinds of green glass reproduce green very well ; others give only blue or yellow effects. There are also other examples : a red glass, superimposed upon a yellow glass, giving an orange by transparency, produces only red upon the sensitive plate. A red glass, superimposed upon a blue glass, giving violet by transparency, first produces a violet, then blue follows : the red being replaced by an orange green, also quickly reproduces blue. A white paper, colored green by green leaves, is reproduced only very slowly by contact; the sensitive plate remains red a very long time, as if the light had no action; and if the exposure be prolonged, a bluish grey tint is produced ; the same result takes place if we attempt to reproduce natural foliage in the camera, such as, for instance, the herbage of a green meadow; but if the foliage be a blue-green, as, for instance, the leaves of the dahlia, the blue tint will be more vivid. If the foliage be yellow or red, like that of dead leaves, the color reproduced will be a yellow or a red, more or less pure, according to the greater or lesser absence of the blue matter, which, with the yellow, constitutes the green color of leaves. The dye of a peacock's feather is well reproduced in the camera, that is, the color appears under a certain degree of incidence, now green, now blue."

### Manufacture of Soluble Glass Soap.

The following description of the manufacture of soap is condensed from *The Grocer* (London), which contains an account of the famous soapery of William Gossage & Sons, near Warrington, England :—

"These works were commenced on a small scale in 1855, by Wm. Gossage, senior, whose long experience as a manufacturing chemist is well known, and whose position in this capacity was recognized by his being selected by the Royal Commissioners for the important appointment of juror to assist in deciding upon the relative excellence of the various products submitted to the Chemical Class of the recent International Exhibition. In that year, in consequence of the war with Russia, the value of all kinds of fats and oils used in the manufacture of soap was greatly enhanced. Mr. Gossage directed his thoughts to finding a substitute possessing some of the properties of Russian tallow, and thereby decreasing to some extent our dependence upon Russia for a supply of this article. Mr. Gossage found that the compound known as soluble glass, or silicate of soda, was possessed of high detergent powers, and, when prepared and applied in a suitable manner, it proved to be a highly-valuable compound for combining with ordinary soap. Silicate of soda is a compound in which soda exists in a state of weak combination with silica, thereby retaining its cleansing power, just in the same manner as it does in ordinary soap. A patent was then taken out by Mr. Gossage for the improvement, and the manufacture of it has since become very extensive and profitable, and a prize was awarded for such soaps at the late International Exhibition in London. The soluble glass (silicate of soda) is made as follows :—

"The apparatus employed for this purpose consists of a large reverberatory furnace, in which are melted together certain proportions of fine white sand and dry carbonate of soda (soda ash) of best quality. Each charge weighs about 25 cwt., and requires six hours of very strong firing to effect its fusion and perfect combination of the materials. The melted charge is then withdrawn by opening a 'tap-hole' in one side of the furnace, and it runs out as perfect glass. We were shown various articles, such as decanters, vases, &c., blown and molded from this glass, and were not a little surprised when informed that these were soluble in water. The lumps of glass thus obtained are transferred to large vats, in which they are exposed to the action of boiling water, and the solution produced is run off into boilers, to be concentrated to a suitable strength for transport to other soap manufacturers.

"The caustic lyes for the manufacture of soap, to combine with fatty matters, are made by first dissolving crude carbonate of soda and filtering it. The carbonate of soda contains some sulphur which must be removed, or the soap made from it will not be of a good color. These crude soda liquors are purified by Mr. Gossage by exposing them to the action of atmospheric air, by distributing the rough liquors over the innumerable surfaces presented by pieces of coke contained in a high tower, at the same time that atmospherical air passes through the tower. We saw the very impure liquor being supplied at the top of the tower, and flowing out from the bottom in a state of purity, the only agent employed being atmospherical air, which applied itself to its work of purification without any trouble or assistance. Mr. Gossage obtained a patent for this invention in 1853, and it has been adopted, under license from the patentee, in many other soap manufactories.

"The soda lye thus treated for its sulphur, is still unfit for soap-making, as it contains carbonic acid, which must be removed to render it caustic. This is effected in the usual way by mixing newly-slacked lime in nearly equal proportions with the soda ash. Carbonic acid has a greater affinity for the lime than the soda, therefore it leaves the soda and combines with the lime, forming chalk, and leaving the clear liquor purely caustic-soda.

"The soap manufacturer requires a large supply of steam for boiling the contents of his soap coppers. This has heretofore been obtained by the evaporation of water in steam boilers. It is also a fact, that it is a desideratum with the soap manufacturer to be supplied with more concentrated lyes than he obtains from his causticizing process. These he has hitherto obtained by concentration with special consumption of fuel. Mr. Gossage has combined these two operations into one, by supplying his steam boilers with weak lyes, and applying the steam produced to boil the soap ; and when the lyes become sufficiently concentrated, these are raised by the pressure of steam to a reservoir sufficiently elevated to supply the soap-pans. Thus an important economy of fuel and a great convenience in the manufacture are simultaneously obtained.

"The alkaline solutions or soda lyes used in the manufacture of soap furnish the real detergent agent of the soap itself, inasmuch as the tallow, oil, or other material of this kind, is simply a vehicle for applying the soda to produce its cleasing effect in the most convenient manner. The boiling-house of the soap manufactory has ten large soap coppers, arranged in one line, each of them being provided with pipes and troughs, by which melted tallow and oils are supplied to the coppers by engine power, and other pipes through which steam is introduced to effect the boiling of the soap. The spent lyes are run off from the soap coppers without the usual labor of pumping.

"Engine power is applied for transferring finished soap from the coppers to the frames or molds for cooling. The method heretofore ordinarily employed for effecting this object has been by means of manual labor—a workman using a large scoop or ladle, and, by main strength, lading out the finished soap from the copper and pouring it into buckets, which, when filled, were carried by a number of other workmen, and their contents emptied into frames necessarily distant from the soap coppers. In this way, to cleanse a large boil of soap, probably twenty workmen would be required for three or four hours. Messrs. Gossage & Sons effect this operation in the simplest manner. They have adapted an iron lid or cover to each soap copper, which, by means of a rope or band of india-rubber, can be made to effect a perfect closing of the upper part. They have also an iron pipe which passes through the cover, and extends nearly to the bottom of the copper. The upper end of this pipe is sufficiently high to deliver into troughs, which extend into all parts of the framing room. To the upper part of the copper is also adapted a pipe, through which air is passed by means of a force pump worked by the steam engine. As the

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pressure of air, proceeding from this force pump, accumulates on the surface of the soap in the copper, the soap is elevated through the iron pipe, and escapes with much velocity, as from a powerful fountain, flowing into the troughs which convey it directly into the frames. In this way, with the attendance of only three workmen, as much as twenty tuns of soap can be transferred from a soap copper into frames, at the most distant part of the house, in twenty minutes.

"It would be useless for us to attempt to convey a technical knowledge of the manufacture of soap. This is an operation which has been greatly advanced by the application of chemical science; in fact, it has become a chemical manufacture, and its success as a commercial pursuit must be greatly dependent on the amount of practical science applied to the accomplishment of its details."

## VALUABLE RECEIPTS.

Top Dressings for Wheat.—Dr. Voelcker, chemist to the Royal Agricultural College at Cirencester, England, gives the following composition for top dressing for wheat on light soil:—Nitrate of soda, 1½ cwt.; common salt, 3 cwt.; Peruvian guano, 2 cwt.; soot, 40 bushels—to be mixed with dry substances, sand and coal-ashes, so as to make about 60 bushels of a manure which will be sufficient for three acres.

Soldering Copper.—The surfaces of copper to be joined are first made bright and covered with powdered sal ammoniac, or a mixture of resin and sal ammoniac, before applying the soldering iron with the solder. A strong solder for copper consists of 3 parts of copper and 1 of zinc; a soft solder consists of 6 parts of brass, 1 of tin and 1 of zinc.

To Make Gunpowder.—Pulverize separately, 76 parts of nitrate of potash, 11 of sulphur, and 13 of freshly burned charcoal, and mix them with a little water, so as to form a cake when rolled out on a board. This is then dried on a clean sheet of paper placed in a warm situation, and afterwards crumbled into grains. It will form unglazed gunpowder.

Port Fire.—The port fire used for cannon is composed of 3 parts of niter, 2 of sulphur, and 1 of gunpowder, well mixed and rammed into cases.

Signal Lights.—Such lights are generally composed of sulphur and niter with a small quantity of metallic sulphuret. Mix 600 grains of niter, 2 of sulphur, and 100 of the yellow sulphuret of arsenic, and ram it into a conical paper case. When touched with a red hot iron it deflagrates rapidly with a brilliant white light. The sulphuret of antimony may be substituted for that of arsenic.

Indian White Fire Signal.—Take dry niter 24 parts, sulphur 7 parts, powdered charcoal 1, or instead of the charcoal, 2 parts of the red sulphuret of arsenic. Mix them intimately in an iron vessel, and ram the mixture into thick paper cylinders of about three inches in length by one in diameter. These are kept in a dry place, and when one is required to be used, it is set on end, and a piece of red hot charcoal placed upon it.

Inextinguishable Match.—Take 4 parts of dry niter, 2 of gunpowder, 2 of charcoal, and 1 of sulphur, and mix them; then ram the compound into paper cases nine inches in length and of the thickness of a common quill. When this composition is inflamed, rain will not extinguish it; the burning end of the match must be cut off to stay the fire.

Percussion Pellets.—Mix equal parts of the chlorate of potash and sulphuret of antimony with liquid gum, so as to form a paste. When dry it may be formed into pellets, and used as percussion powder for guns. This composition, placed on the ends of splints dipped in sulphur, produces friction matches. This mixture may also be employed for percussion caps, only the gum is not mixed with the chlorate of potash and antimony; these two substances mixed together dry are forced into the caps, and a drop of varnish deposited on the inside surface of each. A mixture of the fulminate of mercury, chlorate of potash and sulphur, however, is more commonly used for lining percussion caps.

Westphalia Hams.—These usually come by the way of Hamburgh, and owe their fine flavor to being "cold-smoked." The hams are hung in the upper part of the building, the smoke is generated in the cellar and carried up to the smoking-room through tubes. During its ascent it deposits all moisture, and when it comes in contact with the hams it is both dry and and cold, so that no undue change occurs in the meat while being smoked.

### Geology of the South Atlantic Coast.

The following is an interesting extract from a series of articles on the above subject, published in the *Friends' Intelligencer* by Yardley Taylor:—

"The great geological feature of the Atlantic coast south of New York is the large development of the tertiary strata. It would seem as if some powerful force from the North was acting while this was being deposited. The Delaware, the Susquehanna and the Potomac each turn directly south soon after meeting tide-water. There must have been a cause for this, and that cause may have deposited these materials where they are. In many places are large beds of sea-shells; indeed, almost the whole expanse beyond the primitive rocks gives evidence, by the presence of shells, of having once been under sea-water. In some places, where the surface soil rests upon these decaying shells, and they are within reach of the plow, the soil seems of inexhaustible fertility. In New Jersey are extensive deposits of green sand, that act well as an amendment to some soils. These grains of green sand contain potash in considerable proportion; hence, probably its value. The marl in the South, through Maryland and Virginia, contains some green sand, though in less proportion than in New Jersey. This tertiary formation usually covers up the primitive to some extent, except where streams have laid the latter bare. Iron ore is largely met with in the neighborhood of Baltimore, and lignite is found in the hills. One great disadvantage in this formation, as regards agriculture, is, that the materials having, as it is believed, been deposited by water, a sifting operation, if it may be so termed, has been carried on, by which, instead of an indiscriminate mixing of all the materials together, they have been separated and deposited in great measure separately. Thus we find in one place sand, in another clay, in another pebbles, and the lime and potash, so necessary in good soils, have been carried away. Lime is generally deficient in this deposit on the surface, but in most places this can be remedied by marl, as that abounds largely along tide-water, or by oyster-shell lime. This tertiary deposit widens greatly as it extends southward. It is but about forty miles from Philadelphia to the sea-shore directly across New Jersey, while nearly the whole length of some of the Southern States is occupied by it. It very rarely rises to the height of 200 feet above tide-water, while most of it is at less than one-half of that elevation. It varies greatly in productiveness, from very fertile soils to very poor sand, that will scarcely produce heath; much of it, however, is too wet, owing to its being so level, and drainage would improve it much. Among the various deposits of this tertiary region is that of the 'infusorial within the corporate limits of the city of Richmond.' This deposit, usually of a light grey, almost white color, is remarkable for the abundance of minute, organic forms that it contains. These organic forms are the minute silicious fossil remains of a class of very minute insects with silicious instead of calcareous shells. One remarkable property of these remains is their lightness; being, in their ordinary state of compactness, only about one-third the weight of water of equal bulk. The texture of the mass is very fine, and appears free from gritty particles, yet it is used in polishing metals. The number of these silicious skeletons in each cubic inch, it is supposed, can only be reckoned by millions, and a cubic foot would contain a multitude far exceeding in number the entire human population of the globe."

A French gentleman, M. Mouls, has just written a book on oysters, in which he informs the world that the oyster is "an acephalous molluscous bivalve." Who would have thought it!

An advertising chandler modestly says that, "without intending any disparagement to the sun, he may confidently assert that his octagonal spermacetti are the best lights ever invented."

### Improvement in Gunpowder.

A new description of gunpowder, invented by Captain Schultze, of the Prussian Artillery, has been submitted to Napoleon III for his approbation. In consequence of the success which attended the preliminary experiments, made in presence of the inventor, the Government has determined to continue them on a larger scale. The new composition contains the elements of the powder at present in use; but the superfluous and dangerous parts are excluded by adding a new principle to them. Among the advantages attributed to the new gunpowder are those of being manufactured, preserved and transported, without danger of explosion until the moment when, by a last and rapid operation, it may be rendered fit for charging fire-arms. In this respect the powder will be beneficial to the operatives engaged in the manufacture and transport of such a dangerous substance. It fouls muskets and cannon much less than the powder at present in use, and it may be recollected that this defect for a long time delayed the progress of rifled fire-arms. The smoke produced by Captain Schultze's gunpowder is of so light a specific weight that it disperses almost instantaneously. This advantage, which was established in several German mines, will be appreciated by all conversant in subterranean works, who are aware how much thick smoke adds to the difficulties of operations executed under ground. What particularly induced the Government to turn its attention to M. Schultze's gunpowder is its cost price, which is about one-half that of ordinary powder. If it can be introduced into use in the French army it will save the Government many millions of francs.—*Paris Correspondent of the Times.*

### A Garroter Philosophizing.

Solitary confinement is a choice opportunity for reflection. I carefully considered the constitution of society, and became more and more convinced that civilization is a sham and respectability a swindle. Heroes, from Hercules downwards, have had a noble confidence in the direct appeal to physical force. Might makes right. Louis Napoleon, the best modern example of a great man, sacked the swag of the Empire by garroting the Republic, and France was politically throttled by that "great prince" in the *coup d'etat.* The law of nature is, that the strong shall take from the weak, the bold from the timid. The growth of civilization is a regular progress from violence to cunning. Among savages the greatest savage rules; as he waxes old he props his declining strength by policy; he invents plausible reasons why what he has got by force should not be taken away by force. Hence law, religion, morality—all of them appeals of human cunning to human cowardice. The majority of mankind are cowards. Government by majorities means repression of the noble instincts of the lion-hearted few by combination of the mutton-livered many. There will always be a sufficient proportion of slavish dispositions that prefer to plod through a daily drudgery of labor for a scanty pittance, rather than risk their skins in adventure. Nothing so irritates me as the outcry for public safety. It is a most gratuitous assumption that the world was ever intended to be a safe place at all. Safety is a comparative approximation only, and it is fighting against nature to try to make it an absolute condition.—"*Moral Philosophy of Garroting,*" *by a Retired Practitioner in the Science.*

Per-cent of Depreciation.—The value of a thing may advance one, two, three or four hundred per cent, but so long as anything sells at any price whatever, it has not fallen 100 per cent, for when it depreciates 100 per cent it is utterly valueless, and this is as low as anything can get. Yet we see some newspapers speak of the old Continental money as depreciating 500 per cent; and it is remarked that in some cases one thousand dollars of paper were sold for one of silver. Even this depreciation is not equal to 100 per cent—it is ninety-nine and nine-tenths per cent.

Pile-cutting Machinery.—A correspondent, Mr. A. M. White, of Bridgeport, Conn., in answer to our call for a pile-cutting machine, submits to us a very good design for the purpose, which we think he would do well to alter in some parts, and then secure it by Letters Patent.

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## Correspondence

### The Distillery Business---Fermentation.

[Continued from page 166.]

Fermentation is the most important process in the manufacture of whisky; the product of it is an intoxicating liquid called "alcohol." The doctrine of fermentation is of great use, and should be well understood by distillers, as it is the very basis of the art of making fermented liquors, and, if more attended to, a much purer whisky, as well as a greater quantity of it, will be obtained from the same material than at present. Fermentation is the decomposition of a substance containing no nitrogen—a metamorphosis, whose action depends upon the joint influence of warmth, air and moisture. In nitrogenized substances of a very complex construction fermentation is spontaneous, when water and a sufficiently high temperature are adduced. Substances destitute of nitrogen, on the contrary, require the presence of some nitrogenized substance already in a state of fermentation, in order to undergo the metamorphosis; they require, in other words, the interposition of ferment or yeast. I may mention here that the chemical analysis proves, beyond doubt, that one atom of grape sugar, for instance, having the number 40, consists of 12 parts of carbon, 14 parts of hydrogen, 14 parts of oxygen, but contains no nitrogen whatever.

Yeast, as formed during the fermentation in beer, is nothing but gluten, and all albuminous matters are converted into yeast. The yeast which rises to the top of any fermenting liquid is composed of ovoidal globules of very minute size, varying from $\frac{1}{25000}$ to $\frac{1}{75000}$ of an inch in diameter, the surfaces of which have minute appendages, which move about in all directions and propagate—indicating that they have vitality and are organized beings. When a liquid contains an excess of ferment, the latter continues acting until all the sugar is converted into alcohol and them loses its properties as a ferment in the same liquid, or its existence ceases, because its nourishment—the sugar—is removed. In the course of fermentation these beings are produced by millions Yeast employed for producing the various fermentation is in an active state of decomposition. There are different kinds of fermentation, viz., the vinous, acetous, putrefactive, lactic and saccharine fermentations.

The alcoholic or vinous fermentation converts sugar into alcohol by the peculiar decomposition which sugar undergoes under certain circumstances, when carbonic acid gas is eliminated and alcohol obtained At the same time, a yellow or gray insoluble substance, containing a large quantity of nitrogen, is produced, which is called ferment, having the power of inducing fermentation in a new solution of sugar, and which has its origin from the azotized constituents of the juices, called gluten or vegetable albumen. It is certain that the wort or infusion of malt contains the azotized matter of the wort or the gluten, and the ferment is formed from the gluten at the same time that the transformation of sugar is effected, in the same condition as the gluten exists in the juice of grapes. The wort will ferment at once by the addition of very little yeast, and, after the decomposition is completed, the quantity of ferment or yeast is found to be thirty per cent greater than it originally was. This is the basis for the manufacture of the so-called "dry yeast." The yeasts from beer and wine are quite identical.

The presence of a ferment is essential to excite this fermentation, as a solution of pure sugar will remain unaltered. But if a small portion of yeast be added to the solution, whose molecules are in a state of decomposition, fermentation will take place at once, under a temperature of 4° Fah. and upwards; for, in this case, the liquid or beer will appear turbid, but as soon as fermentation ceases it becomes clear. In the juices of sweet fruits, such as grapes and blackberries, the ferment is supplied by nature, and is intimately associated with the saccharine matter. For this reason, juices of sweet fruits pass naturally into a state of fermentation, and by the particular motion of its particles, communicate its action to the sugar. In those vegetable solutions which do not pass into a state of fermentation, there is a deficiency of nitrogenized matter, and hence it becomes necessary to supply some fermenting agency. An infusion of malt ferments spontaneously, and can, therefore, be used as such an agent. It is in this respect like grape juice, and forms the basis for the manufacture of spontaneous yeast, commonly used in our distilleries.

It has been determined by the researches of Collin, Thinard and Rousseau that a ferment, in order to be able to excite the vinous fermentation, must be in a certain degree acidulous. The juices of fruits contain a considerable quantity of acidulous matter, but a malt infusion contains very little. A small quantity of vegetable acid added will considerably promote the fermentation of a malt infusion. This vegetable acid, which we are able to produce in a malt infusion by its own action, under certain circumstances, is the basis for the manufacturing of lactic-acid yeast. Many years' experience has demonstrated that any sweet yeast lacking this vegetable acid can never produce so thorough a fermentation and secure such a rich yield of alcohol as an acidulous ferment.

We say, then, that any artificial yeast should always contain a certain amount of vegetable acid, and that this acid must be first created in the wort before we put the latter into fermentation. In fermentable fruits and liquids of spontaneous character, as already observed, this acid pre-exists, composed of tartaric, citric, malic and lactic acid; in a sweet malt infusion or wort we must first create it. It is also worth mentioning that the vegetable acid is very different from acetus acid or vinegar, the former being without odor or scent, the latter having a sharp, penetrating smell. Every fermentation operates by resolving a body into compounds less complex than itself; but the so-called acetic fermentation serves to combine, on the contrary, two bodies, namely, alcohol and aldehyde, with the oxygen of the air. So we see that even the origin of the acetic acid or vinegar is entirely different from that of the vegetable or lactic acid.

The manufacture of lactic-acid yeast is very simple, but requires considerable attention and care. No hops are used in making it, because hops greatly prevent or counteract the process of acidification. The temperature of the yeast mash or wort must be regulated every three hours during the first twelve hours until the required vegetable acid is produced. The different degrees of the temperature of the wort observed at certain periods will create corresponding degrees of vegetable acid, after which the acidified wort must be set into fermentation. In making this lactic-acid yeast spontaneous fermentation is to be carefully avoided during the period of acidifying the wort; and the older lactic-acid yeast becomes, the more effective it will be. Sometimes it will last a whole year or longer without any new "start," transplanted from one day to another. Its most perfect development is indicated by the higher degrees of a self-raising temperature, and when it has attained this temperature it is ready for the mash; but when the temperature has already decreased, before it is used, the fermentation of the beer will not be perfect. Hence it is necessary to regulate the management of the house so that, when the yeast has arrived at the highest development, the mash must be ready to set with the yeast. No virgin yeast, no "boil-downs," no *dona*, or night yeast or day yeast are required in the operation, and all the numerous chances for making mistakes, frequently made during those numerous processes, are entirely cut off.

[To be continued.]

### Soap-making.

Messrs. Editors.—I have had my attention called to your valuable receipts, several times, by parties who had tried them and were satisfied with the results. Quite recently I thought I would try soap-making, and, although, I never made any in my life before, I succeeded at the first attempt by following the receipt published in your paper on page 70, current volume. I would suggest, however, that instead of making the lye at home, it would save trouble to purchase the article already manufactured; it is sold in nearly all towns and cities under the name of "concentrated lye." I have found that a pound box of this lye, five pounds of grease and a quarter of a pound of borax are good proportions to observe; a teacupful of salt, added just before taking off the fire, makes the soap hard and firm. The lye should be put into two quarts of water and left to settle, and when clear poured into the boiler; then add the fat and borax and boil two hours and ten minutes. Any one can tell by the appearance of the soap when it is done, as it looks "thready" when dropped from a knife. This is a fine white curd soap, from which, by following your directions, any fancy-colored or scented soap can be made. I challenge any one to produce a better family soap than I have made at *two cents* a pound. I hope you will publish this letter as I consider it of the greatest importance in these times that we should retrench our expenses.

A. J. C.

Detroit, Mich., March 10, 1863.

### Fast Turning.

Messrs. Editors:—You speak of the importance of drilling centers in all pieces of iron to be turned in finishing, in a late number of your valuable paper. We have a little machine in use for that purpose (made at some place near Boston), which does it rapidly and accurately; and while I am about it, I may as well tell you what was accomplished by one man in the month of January, 1863, by that and other suitable machinery. The work to be done was to center, straighten, and turn $1\frac{1}{8}$ inch shafts, 21 inches long, and $1\frac{3}{8}$ inch shafts 15 inches long, that had been cut off in a hollow mandrel lathe, perfectly square and of the right length. Each shaft was turned on an average of 11 inches and was run over twice with the tool, and was turned to fit a solid cast steel hardened gage, which must both touch and go. The larger shaft had to be dressed three times and the smaller one twice, and this man finished in a workmanlike manner one thousand of these shafts in $24\frac{3}{4}$th days, working two small Putnam Machine Company's lathes, and grinding his own tools. When you can find some one to beat this, we will try to do better.

Utility.

Auburn, N. Y., March 4, 1863.

### Black Diamond Steel.

Messrs. Editors.—In reference to the manufacture of steel we desire to state that there are in Pittburgh, in full operation, four extensive steel establishments daily producing the best quality of cast steel, equal to any imported from England. *Our* works were erected exclusively for the manufacture of the finest quality of cast steel for tools; their present capacity is thirty tuns per week, and they will ere long be in condition to double that quantity. The steel made at our works has been thoroughly tested by a number of the extensive axle and other edge-tool manufacturers, as well as by some of the best mechanics of the country, all of whom pronounce it equal in every respect to the very best English steel. The works are located on the bank of the Alleghany river in this city; the ground occupied embraces an area of over one hundred and fifty thousand square feet.

Any person doubting the statement that our steel is equal to any imported from England, can easily try it, and that too, if they wish, at our expense. If, after a fair trial, it does not prove to be as good as any imported, we will charge nothing for it. Our intention is to make the manufacture of the finest qualities of cast steel a perfect success, and ere long convince all who may be credulous upon the subject, that they need not any longer look to other countries for a supply of this important article.

Park Brother & Co.

[We refer our readers to an advertisement of Messrs. Park Brother & Co. in this number under the heading of "Black Diamond Steel Works," and we are much pleased to hear that this branch of manufacture is assuming important proportions in our country.—Eds.

Pittsburgh, March 9, 1863.

Flexible Sulphur.—A very curious chemical discovery has been made by Dissenbacher, a young German chemist. By the addition of a small quantity of chlorine or iodine, pure sulphur is rendered perfectly soft; and the Paris Academy, to whom the experiment was exhibited by H. Deville, were astonished to see a thin leaf of sulphur thus treated as flexible as if made of wax.

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### A Splendid Figure as True as Beautiful.

In the whole range of literature, we do not remember to have read a more striking and beautiful comparison than in the following, which we copy from "The Autocrat of the Breakfast-table," by Dr. O. W. Holmes, of Boston. The figure is so natural and perfect, the application so graphic, as to render it one of the happiest efforts in the English language. It is specially applicable to the present time :—

"Did you never, in walking in the fields, come across a large, flat stone, which had been, nobody knows how long, just where you found it, with the grass forming a little hedge, as it were, all around it, close to its edges? and have you not, in obedience to a kind of feeling that told you it had been lying there long enough, insinuated your stick, or your foot, or your fingers, under its edge, and turned it over as a housewife turns a cake, when she says to herself, 'It's done brown enough by this time.' What an odd revelation, and what an unforeseen and unpleasant surprise to a small community—the very existence of which you had not suspected, until the sudden dismay and scattering among its members produced by your turning the old stone over! Blades of grass flattened down, coloress, matted together, as if they had been bleached and ironed; hideous crawling creatures, some of them coleopterous or horny-shelled turtle-bugs, one wants to call them; some of them softer, but cunningly spread out, and compressed like Lepine watches; black, glossy crickets, with their long filaments sticking out like the whips of four-horse stage coaches; motionless, slug-like creatures, young larvæ, perhaps more horrible in their pulpy stillness, than even in the infernal wriggle of maturity! But no sooner is the stone turned and the wholesome light of day let upon this compressed and blinded community of creeping things, than all of them which enjoy the luxury of legs—and some of them have a good many—rush round wildly, butting each other and everything in their way, and end in a general stampede for underground retreats from the region poisoned by sunshine. Next year you will find the grass growing tall and green where the stone lay; the ground-bird builds her nest where the beetle had his hole; the dandelion and the butter-cup are growing there, and the broad fans of insect-angels open and shut over their golden disks, as the rhythmed waves of blissful consciousness pulsate through their glorified being. . . . . .

"There is meaning in each of those images—the butterfly as well as the others. The stone is ancient error. The grass is human nature borne down and bleached of all its color by it. The shapes which are found beneath are the crafty beings that thrive in darkness, and the weaker organisms kept helpless by it. He who turns the stone over is whosoever puts the staff of truth to the old lying incubus, no matter whether he do it with a serious face or a laughing one. The next year stands for the coming time. Then shall the nature which had lain blanched and broken rise in its full stature and native hues in the sunshine. Then shall God's minstrels build their nests in the hearts of a new-born humanity. Then shall beauty—divinity taking new lines and colors—light upon the souls of men as the butterfly, image of the beatified spirit, rising from the dust, soars from the shell that held a poor grub, which would never have found wings had not the stone been lifted. You never need think you can turn over any old falsehood without a terrible squirming and scattering of the horrid little population that dwells under it."

### Ears of Song Birds.

It is mentioned in an interesting work, entitled "Miscellanea Curiosa," that Mr. Clayton and Dr. Maudlin discovered a remarkable peculiarity in the structure of the ears of birds, particularly those distinguished for their song. Contrary to what takes place in man or in quadrupeds, there is in birds almost a direct passage from one ear to the other, so that, if the drum of both ears be pricked, water will pass, when poured in, from one ear to the other. There is, however, no chochlea, but a small chochlea passage, which opens into a large cavity, formed between the two bony plates of the skull, and this passes all around the head. The upper and external plate of the bone, forming the skull, is supported by many hundreds of small thread-like pillars or columns, which rest upon the lower and interior plate, immediately over the brain.

Now, what is worthy of attention is, that this passage between the outer and inner plates of the skull, was observed to be strikingly larger in song birds than in birds which are not possessed of musical powers. So very remarkable this difference is described to be, that any person to whom it has been once pointed out, may readily pronounce, upon inspecting the skull of a bird, whether it was a bird of song or otherwise, though he might have no previous knowledge of the bird or its habits.

No other animal, examined with a view to comparison in these particulars, was found to have any resemblance of conformation, except the mole—an animal reputed to be very quick of hearing.

This singular construction of the skull in birds is evidently conformable to the known principles of acoustics, and is, in fact a sort of whispering gallery for increasing the intensity of the sounds conveyed to the ear.

It would be worthy of the investigation of anatomists to endeavor to ascertain whether the skulls of celebrated musicians have a greater interval between the outer and inner tables of their skulls than those who are deficient in musical ears.

### A Photographer's Experience.

Whilst engaged in taking the views alluded to, a farmer's boy of about eighteen years of age had renus every assistance in drawing our boat on shore and in fixing our tent. Seeing, probably for the first time, the arcana of the photographic art, he hung around us in perfect raptures; and finally, when we had finished, he very gently, almost bashfully, inquired if we could take a copy of a daguerreotype. We replied in the affirmative, and promised to take such a copy if he would fetch it. His eyes sparkled with delight, and he sprang off in an instant and said he would return in ten minutes. The nearest house was certainly half a mile off; to this he hastened and as quickly returned. He handed us the daguerreotype with a blush. "My dear fellow," we said when we opened the case, "there is no picture here." "No," said he, "that's just it; I thought you could copy it or bring it out again; some of the girls of the house, I suppose, have rubbed out the picture because she was so handsome, a great deal handsomer than they are." We looked the boy directly in his eye; he was quite serious. "We are sorry," we said, "we cannot do what you wish; we cannot possibly restore that picture." The boy's looks became quite despondent: we thought we understood the interpretation of his feelings, and continued: "But we will go with you a couple of miles and take a new picture of the young lady, if that will please you." A tear trickled from his eye and he sobbed the few words—"*She is dead!*" We comprehended at once the full extent of his young heart's desire and his unspeakable disappointment. —*Humphrey's Photographic Journal.*

### The Glory of the Pines.

Magnificent! nay, sometimes, almost terrible! Other trees, tufting crag or hill, yield to the form and sway of the ground, clothe it with soft compliance, are partly its flatterers, partly its comforters. But the pine is serene resistance, self contained; nor can I ever, without awe, stay long under a great Alpine cliff, far from all house or work of men, looking up to its companies of pine, as they stand on the inaccesible juts and perilous ledges of the enormous wall, in quiet multitudes, each like the shadow of the one beside it—upright, fixed, spectral, as troops not knowing each other—dumb forever. You cannot reach them, cannot cry to them—those trees never heard human voice; they are far above all sound but of the winds. No foot ever stirred fallen leaf of theirs. All comfortless they stand, between the two eternities of the Vacancy and the Rock; yet with such iron will, that the rock itself looks bent and shattered beside them—fragile, weak, inconsistent, compared to their dark energy of delicate life and monotony of enchanted pride; numbered unconquerable.—*Ruskin.*

The Government tax men have decided that a pig becomes a hog at six months old; and slaughtered hogs are taxed, while assassinated pigs are not.

### If You mean No, say No!

When a man has made up his mind to do or not do a thing, he should have the pluck to say so, plainly and decisively. It is a mistaken kindness—if meant as kindness—to meet a request which you have determined not to grant, with "I'll see about it," or, "I'll think the matter over," or, "I cannot give you a positive answer now; call in a few days and I'll let you know." It may be said, perhaps, that the object of these ambiguous expressions is to "let the applicant down easy;" but their tendency is to give him useless trouble and anxiety, and possibly to prevent his seeking what he requires in a more propitious quarter until after the golden opportunity has passed. Moreover, it is questionable whether the motives for such equivocation are as philanthropic as some people suppose. Generally speaking, the individual who thus avoids a direct refusal, does so to avert himself pain. Men without decision of charter have an indescribable aversion to say "No." They can *think* "No"—sometimes when it would be more creditable to their courtesy and benevolence to say "Yes"—but they dislike to utter the bold word that represents their thoughts. They prefer to mislead and deceive. It is true that these bland and considerate people are often spoken of as "very gentlemanly." But is it gentlemanly to keep a man in suspense for days, and perhaps weeks, merely because you do not choose to put him out of it by a straightforward declaration? He only is a gentleman who treats his fellow-men in a manly, straight-forward way. Never seem by ambiguous words to sanction hopes you do not intend to gratify. If you mean "No," out with it!—*Rural New-Yorker.*

### Cricketing.

The first portion of a curious and interesting work devoted to cricket and cricketers has just been published by Mr. Frederick Lillywhite, the celebrated cricketer, in England. When complete it will include four volumes of over 500 pages each. Among the curious incidents connected with the "noble game," the author mentions that, on the 23d of May, 1823, eleven married women played against eleven single women at Hockwold-cum-Wilton. The players were dressed in jackets and trowsers, decorated with ribbons. The married women came off victorious. On the 4th of August, in the same year, another match was played at Buckland, in Kent, when the spinsters won by twenty runs. At Parson's Green, near London, as late as 1835, eleven single women beat eleven married women by seven runs, the prize being £10 and a hot supper. The most extraordinary catch ever made at cricket was in a match in the Phœnix Park, Dublin, in 1844, when Captain Adams jumped over an iron fence three feet ten inches in hight, and while in the air caught the ball in his left hand. For this extraordinary feat he was made a life member of the Phœnix Park Club. Mr. Lillywhite mentions a circumstance not generally known in connection with accidents in the cricket field—namely, that Frederick Lewis, Prince of Wales, father of George the Third, died (March 20, 1751) from the effects of an internal abcess formed from a blow he received from a cricket ball some months before, while practicing on the lawn in front of Cliefden House, in Buckinghamshire.

The Origin of Hand-shaking.—The Romans had a goddess whose name was *Fides* or Fidelity—a goddess of "faith and honesty," to whom Numa was the first to pay divine honors. Her only dress was a white veil, expressive of frankness, candor and modesty; and her symbol was two right hands joined, or sometimes two female figures holding each other by the right hands, whence in all agreements among the Greeks and Romans it was usual for the parties to take each other by the right hand, as a token of their intention to adhere to the compact; and this custom is in more general use even among ourselves, at the present day, than would at first thought be realized.

The stones on the corners of the Exchange, in Boston, are larger than any single stone in Cleopatra's Needle; and those now in erection on the U. S. Treasury building at Washington are much heavier than any stone of Pompey's Pillar or the Pyramids of Egypt.

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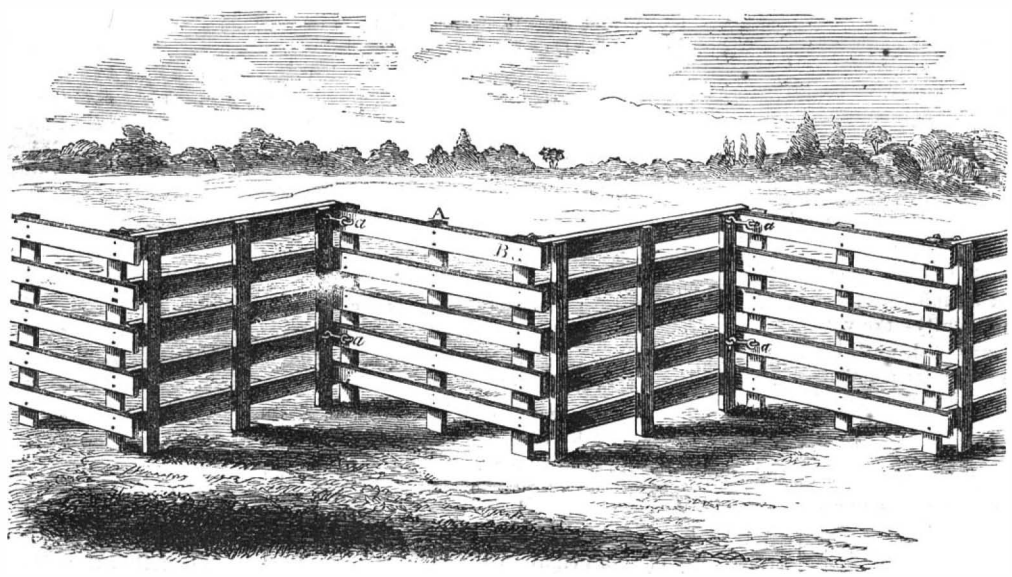
### Improved Patent Farm Fence.

Within the past few months we have illustrated a number of different kinds of portable fences in the columns of the SCIENTIFIC AMERICAN, most of them being subjects of new patents, and all possessing novel features which render them useful to farmers and people in the country generally, who require such structures. The peculiarities embraced in the one here represented are the methods by which the several divisions are united, and so combined as to form a continuous line; each section deriving support from the adjoining one. The panels or sections are formed of the usual uprights, A, and longitudinal rails, B, which are nailed or otherwise permanently fastened together. The rails project beyond the posts very slightly, so as to allow the end of the succeeding panel to be braced against it by the hooks and staples, *a*; the hook is attached to one section and the staple to another; they are intended to be connected with each other when the fence is in position, and will hold the same very firmly. The diagonal position of the several panels very materially adds to its stiffness, as pressure applied at any given point is distributed through several sections by the method of attaching them to each other. This fence was patented Nov. 26, 1861, by O. H. P. Orendorff, of Bloomington, Ill., and further information can be by addressing the inventor at that place.




ORENDORFF'S PATENT FARM FENCE.

### TAKE CARE OF THE MACHINERY.

These are stringent times, and the people cannot be too careful of their outlays. Manufacturers and mechanics have a heavy bill to settle annually for new tools and for repairs on the old ones, and they should take all possible means to see that the machines in hand last as long as possible. Especially in all machines, care must be exercised that they are repaired economically; too often expenses of this kind amount to almost as much as would be required to buy a new tool. Are the brass boxes worn out? Replace them by wooden ones boiled in oil; they work well; the only trouble is that they take rather more oil to lubricate them than metal boxes; they are, however, a good substitute for brass or other substances ordinarily used. It is a tailor's maxim that "a stitch in time saves nine;" and sometimes a bolt or rivet may be put into a machine so as to stay the ravages of time and amply repay the labor. Take care of the tools! Keep them clean and in good order, and one great source of expense, not to say vexation, will be stopped.

### LINSEED AND ITS OIL.

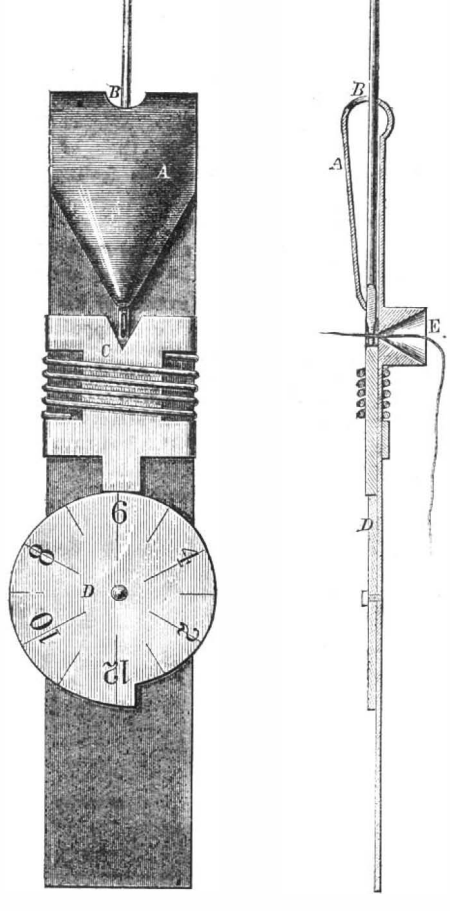
In addition to what we have already said respecting the favorable prospects for the cultivation of flax to obtain fiber, the present prices of flax seed and linseed oil also offer great inducements for its more extensive culture. Linseed oil has recently been selling for one dollar seventy-five cents per gallon, in this city, at wholesale, and flax-seed at from $3 25, to $3 50 per bushel. Flax for rope and cord-making is selling for twenty-five and thirty cents per pound. Land on which oats or corn have been planted in the previous year is well suited for flax when put into good tilth. If the season is favorable and the soil suitable, 14 bushels of seed and 500 lbs. of dressed flax may be obtained from an acre.

### Designs for the New Treasury Notes.

The Government has issued proposals for designs for the new bank-notes about to be issued; these proposals are addressed to artists, engravers and *others*, hence it will be seen that all persons possessing any artistic talent can avail themselves of it to procure a lasting fame. The sum of $200 will be paid for the best design of each denomination, and the Government reserves the right of rejecting all which are unsuitable. Here is a chance for the national talent to display itself to good advantage. The Secretary of the Treasury has issued a lengthy advertisement on the subject, which has appeared in the Government papers.

### IMPLEMENT FOR THREADING NEEDLES.

Some of the most useful class of inventions are those which are applicable to the implements and utensils employed daily in families. Many such have passed through our hands, and we now add one more to the already long catalogue. The instrument here illustrated is a needle-threader, by the use of which the most infirm or near-sighted person can perform this office, without being obliged to call on friends or others to do it for them. Fig. 1, shows an elevation of the needle-threader; it is made of metal and has one of its ends lapped over the main part of it, as seen at A, this lap forms a loop in the top of which a hole, B, is cut, into this the needle is thrust point upwards. The head of the needle is received in the V-shaped depression in the clasp, C; this clasp encircles the body of the instrument and is provided with a spiral spring which keeps the end of it on the cam-wheel, D. The cam-wheel is the principal feature of the invention, and it consists in having its periphery of a constantly increasing distance from the center, starting from a given point. It is provided with a face on which the sizes of the needles are marked, from two to twelve; by turning this dial with the fingers, the V-shaped depression carries the needle up to a small hole made in the plate, and its position is ascertained to be correct when the desired number is uppermost. Fig. 2, shows a sectional side view of the needle-threader, in which the conical opening, E, at the back is seen; this opening guides the thread to the eye of the needle and it is only necessary to place the needle to be threaded in the crotch and turn the cam to the number of its size; the thread may then be inserted without further difficulty. This instrument is the invention of J. O'Kane, of Philadelphia, Pa., and was patented on Feb. 3, 1863; further information can be had by addressing him at 709 Sansome street (or Box 441, Post-office), Philadelphia.




### DOMESTIC MANUFACTURES.

It is a surprising fact that very few housekeepers, even those who pride themselves upon their economical qualities, know how much the expenses of living can be reduced by proper management. Clothing that has been cast away or thrown aside as useless, on account of having faded, can be dyed and restored to its pristine brightness and splendor. This is accomplished by dyes now put up in convenient packages for family use, and sold in most of the cities and towns throughout the country; a good housekeeper can, by the aid of these, materially lessen the expense of clothing the juvenile portion of her family.

Letters Patent are now pending to effect the restoration of faded plush cushions without removing them from the car seats or from the stages wherein they may have been placed; some most beautiful effects are produced by this process. So also with soap; this article is very expensive at present, and all persons interested should consult the valuable receipts for making this substance, published in the SCIENTIFIC AMERICAN, on page 70, current volume. By the aid of these receipts they can supply themselves with soap at a very moderate cost, not exceeding three cents per pound; at all events, at a very much lower price for a better article than the sticky, viscid compounds of resin usually sold for the laundry. These receipts make a beautiful hard white soap. (See page 182 of the current volume).

Look after the furniture; mend up its broken and shaky joints; buy somebody's glue, and apply it as soon as the articles get rickety, and, if you desire to have its appearance benefited, buy a pint of varnish and spend your leisure in earning something. By following this advice you will be much better off, pecuniarily, at the end of the year.

EXCELLENT REPROOF.—When the Athenian ambassadors expatiated much on the beauty of Alexander's person, and his power of drinking a large quantity of wine at one time, Demosthenes heard these reports with indignation; observing that the first became a woman, and that the second contained the quality of a sponge.

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## DO INVENTIONS BENEFIT THE WORKING CLASSES?

Some modern writers, more fond of rhetorical embellishment than of patient investigation, have asserted that the introduction of new tools and machines into the arts naturally results in depreciating the moral and social condition of the operatives themselves. These theorists have depicted supposititious cases wherein the skillful craftsman is represented as standing mournfully amid his ruined prospects, ragged, famished and altogether in a pitiable state of mind and body; these miseries being incident upon the introduction of tools to supplant manual labor. No importance can be attached to such statements, if indeed they should be dignified with any notice whatever; they are wholly imaginary and cannot be supported by a particle of evidence. If, on the contrary, we look on the opposite side of the shield—if we consider how far mankind are benefited in having their hard work performed for them by machinery—we shall find that we have some ground worth surveying and some facts and features which are worthy of attention.

Where one person was formerly employed by the day's work at manual labor, twenty are now hired; instead of one person being discharged because a new invention made his or her labor valueless, a dozen are in request to look after the tools that have been introduced to do the work better and quicker. If we are asked for a proof of this assertion, we may take at random the mills in the city of Lowell. In 1822, there was but one mill in that place for the manufacture of cotton cloth. Since that time there have been upwards of sixty factories built and put in operation to supply the demand for the fabric in question. What caused this increase? The demand for cotton goods, primarily; but how could that demand have been satisfied except by the invention of the power-loom; or by what agency, other than the great popular call for cheap stuffs, filled by the substitution of machine for manual labor, would those long rows of mills, the pride of the Eastern States, have arisen so rapidly? Look at the thronging thousands that now fill the streets of our cotton-spinning towns, and compare them with the few who were seen there in the darker ages when tools were comparatively unknown, and we have the strongest evidence that the invention of this one machine (the power-loom) has immeasurably increased the demand for work-people.

It is not, however, in the case of the cotton spinners alone that we may trace a decided gain to the community in the substitution of machinery for slower and more fatiguing manual processes. In the sewing machine manufactories and in the production of watches by machinery we have the amplest proofs that our assertions are not extravagant—that when we say inventions benefit the working classes, we only repeat facts that are substantiated by every day experience. There are not only more mechanics employed now than formerly, but there are more wages earned by each man than there were years ago, and their social standing is also much better than before the age of machinery. The sewing machine manufactory at Bridgeport, Conn., is an example of the system of producing machinery by machinery; the watch factory at Waltham, Mass., is another; and we assert, emphatically, that we have never seen a class of workmen who were more intelligent, well-to-do, and energetic than can be seen at those places. These manufactories have tools for nearly every conceivable purpose; but even machinery, however well made, must have a human brain to look after it—to direct its operations—in short, to perform the office of confidential adviser, as it were, to the serf that readily obeys its master's will.

If we wanted more evidence on this point we have it on every hand. Ask the sewing women if they make more or less wages than they did before the advent of their special machines; if they are less able to procure the comforts and necessaries of life now than heretofore. They will answer with one accord that their situations generally are far better and happier than in the ancient days of slow toil and inadequate compensation. And so it is with every calling. There is hardly one that has not been improved immensely by the use of machinery. Let the reader draw a parallel between the farmer who uses cultivating, reaping and thrashing machines, and he who adheres faithfully to the system his ancestors practiced—"who breaks the stubborn glebe" with hoe or lumbering plow, while his more enterprising neighbor outstrips him solely because his mechanical aids enable him to use his time to the best advantage.

As with the farmer and seamstress so with all other callings, and we need not enumerate cases to make our argument strong. Patiently waiting the giants of machinery stand; their mighty sinews are untired and unracked; from early morn till dewy eve they perform their allotted tasks, and at this hour the world is dependent upon their harmonious action. Block up the railroads with snow, and men turn pale lest their engagements be nullified; delay the steamers, suspend transatlantic intercourse, and the world gropes blindly, we may say, until the ruptured communication is restored. All processes of importance depend upon the accurately-working machines provided for them. The happiness and actual sustenance of the greater part of the world depends upon machinery, as do also its intelligence and mental culture. In view of such features as these we cannot doubt that inventions benefit, not only the working classes, but also the whole human family.

## THE NEW ATLANTIC TELEGRAPH.

Measures are now in progress which, to all appearance, will lead to the construction and laying of another Atlantic cable at no very distant day. On the fifth instant an influential meeting of capitalists and merchants was held at the Chamber of Commerce, this city—Mayor Opdyke in the chair—for forwarding the project of the new Atlantic telegraph. Several speeches were made and much information imparted respecting the advantages and practicability of such an enterprise. Mr. Peter Cooper stated that the advantages of telegraphic communication with Europe had not yet fully entered the minds of its warmest advocates. The facility which such a telegraph would afford to merchants in sending and receiving orders, and knowing the prices ranging in European markets, would compensate them for all the cost involved in the undertaking. Such a telegraph would also tend to prevent misunderstandings between Great Britain and the United States. Mr. Cyrus W. Field stated that he wished to correct a wrong impression which had been made upon the public mind with respect to ocean cables. It was a common belief here that all such cables hitherto laid had been failures. This was a mistake; and he read a letter from a firm in London engaged in the manufacture of submarine cables, in which it was stated they had already laid forty-four, the total length of which was nine thousand miles, and all were in good working order, and they were confident of being capable of making a cable for the Atlantic telegraph that would be successful. This firm was willing to become large stockholders and make the cable, leaving a large portion of its cost to depend upon its successful working. They had laid the line of cable between France and Algiers, and it was stated to be 1,535 miles in length, whereas the Atlantic line between Ireland and Newfoundland would be but 1,040 miles, and the ocean depth on the Atlantic plateau was no greater than that of the Mediterranean. It was also stated that four hundred messages had been sent on the old Atlantic cable before it failed to transmit currents, and that its failure was owing to defective construction and to the use of inferior copper. Lake Superior copper was found to be fifty per cent better in conducting power than most other qualities of copper.

It was also stated that George Peabody and the agent of the Baring Brothers and other prominent capitalists in London had subscribed to the enterprise. It was estimated that the line, when laid, would yield an income of over two millions of dollars per annum. The telegraph line to San Francisco, since its completion, had earned enough to pay for its entire cost. Mr. A. A. Low stated, in reference to its utility, that one message to San Francisco, which cost him thirty dollars, was worth three thousand to him. These statements were made to show that in all probability the profits from the Atlantic cable would be amply satisfactory. It was asserted that there would be no difficulty, now, in the laying of a new cable. In England the subscriptions amount at present to £185,000, but there would be no call for them until they reached £300,000. The following resolution was offered by Mr. Low, and unanimously adopted:—

*Resolved*, That, in the opinion of this meeting, a cable can, in the present state of telegraphic science, be laid between Newfoundland and Ireland with almost the certainty of success, and when laid will prove of the greatest benefit to the people of the two hemispheres, and also profitable to the shareholders. It is therefore recommended to the public to aid in the undertaking.

In addition to what was said upon the subject at this meeting we would state that the route for the Atlantic cable has been re-surveyed by two vessels of the British navy, and has been found more favorable than was anticipated. The company in London has also appointed a committee of eminent, practical and scientific men to select a suitable cable, &c. This committee consists of Mr. Fairbairn, F. R. S., Joseph Whitworth, the eminent machinist, and Professors Wheatstone and Thomson—perhaps the most distinguished electricians in the world.

The insulation of telegraph cables has been vastly improved since the first one was laid in the Atlantic, and so has the mode of working them. Formerly a large quantity of electricity was transmitted to overcome the resistance of the wire; now the wave of the electric fluid used is as weak as possible. It has also been found that the current which flows from the copper pole of the battery is the best to work cables. The current from the zinc pole was formerly used, and sometimes both alternately. Very delicate instruments are now also employed to work all submarine lines. Mr. Varley, of London, a distinguished electrician, confidently anticipates that from twelve to sixteen words per minute may be transmitted through the new Atlantic cable. The time has fully arrived, we think, when, for the interests of science, commerce and social life, another attempt should be made to lay a new Atlantic telegraph cable.

## THE ENGINEERING ENTERPRISE OF LONDON.

London is the greatest city in the world, not only on account of its vast population (of about three millions of persons) but its prodigious wealth, and the enterprise and daring of its merchants and capitalists. No other city can compare with it for original and gigantic works of engineering. The tunnel under the river Thames, although an unprofitable undertaking, is one of the world's wonders, and surpasses any work of the kind ever executed in ancient or modern times. It was commenced in 1825 by the elder Brunel, and was eighteen years in the process of construction. After many mishaps and periods of suspension, it was finally completed in 1843, and cost $2,320,000. English engineers and capitalists are distinguished for stubborn perseverance—bulldog determination. Difficulties and disappointments seem to spur them on, rather than to deter them from accomplishing any object which they undertake. The *Great Eastern*, as well as the Thames Tunnel, affords evidence of this spirit. That vessel was built in London; her capacity is 27,000 tuns, which is equal to four huge steamers of the *Vanderbilt* size. She was commenced in 1855, was four

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years under construction, and cost about four millions of dollars. No where out of London we believe, could the capitalists be found, who would have ventured so much in such an enterprise.

Within the last two years we have had other evidences of London enterprise in successful works of a peculiar character, namely, a subterranean railroad and a pneumatic post. The former was a most gigantic affair, requiring great mining skill and involving a cost of several millions of dollars. The engineers burrowed in the ground, turned aside creeks and huge sewers, and built their arches for about four miles beneath the streets trodden daily by multitudes. This is perhaps the greatest engineering feat ever accomplished; the work was five years in progress, and was opened to the public on the 10th of January last. The arch of this tunnel is elliptical in form, sixteen feet and a half in hight, and twenty-eight and a half feet in width. It has two lines of broad gage rails within it, and two of the narrow gage. The broad track is for the Great Western line, the spacious carriages of which are to carry the whole passenger traffic. The iron and mason work of this railroad tunnel are massive, and executed in a superior manner. Several of the stations on it are elegant stone structures, and it is brilliantly illuminated with gas-light. Descending to it from broad day-light in the street, the effect is said to be thrilling. If an ancient Greek was to arise from his grave and be taken into this subterranean railroad, he would attribute the work to some of the deities of his mythology.

The pneumatic post is but a small undertaking compared with the others which we have described, and such a project is not novel; but a company in London deserve the credit of being the first which has had the courage to make the experiment upon a grand scale. The public buildings of Paris excel those of London for ornament and architectural taste; but most of the public works of London surpass those of all other cities for engineering skill and magnitude; the latter may therefore profit by such an example.

In the building of iron steamships London dwarfs all competitors. We learn from *Mitchell's Steam Shipping Journal*, that 87,000 tuns of iron shipping are now being built on the banks of the river Thames, and in the construction and equipment of these vessels, twenty thousand persons are employed. A strong local attachment to London, and a supreme desire to advance its public interests, characterize its capitalists. This is shown in the large donations which many of them make to all new undertakings that promise to advance the material welfare or glory of the British metropolis. This spirit lies at the root of the many great engineering achievements for which London is distinguished.

## BORING STEAM CYLINDERS.

To be reliable and useful, a steam cylinder, or indeed any cylinder in which a piston works, must be mathematically correct as to its diameter from end to end. They are not always so; sometimes far from it. There are several reasons which may be assigned as the cause of the irregularities, and these are the manner in which the cylinder is bolted to the carriage (when bored in a lathe), the kind of tools used in cutting away the superfluous iron, the rate of speed at which the cutters travel, the shape of them, and the degree of temperature the casting acquires while being worked. For all of these troubles there are remedies.

It is the practice in the best shops to bore the cylinders upright, take out a heavy cut at first, and bring the interior of the cylinder by successive cuts (say two), to within the thirty-second part of an inch of the size required; the remaining portion is then removed in the last cut by a tool which is neither a round nose nor a diamond point, but a combination of the two; a moderate feed is given to this tool and the boring head, or its equivalent, started on its journey. The theory is that the round-nosed tool, with fine feed, makes a dead smooth surface; this on first thought might appear desirable, but reflection will show that it is not so. Dead smooth surfaces in steam cylinders, do not wear so well at the outset as those slightly raised or ridged; and this may be accounted for by the larger surfaces exposed and the more intimate relations of the structure of the iron; or of the faces opposed to each other. Thus: cast-iron rings in cast-iron cylinders, are apt to cut when new, unless they are very loosely packed. With the round-nosed diamond-pointed tool, the objection is that the edge of it will wear away quicker, but the cut will be clearer and freer than the legitimate round-nosed tool; it will heat the cylinder less, and we think produce better results generally.

An engineer of much experience has told us that he preferred to have cylinders bored in this manner, to having such very smooth surfaces as are commonly used, and gave as a reason for his opinion that the cylinders were insured a better and more permanent finish than when glazed over at the foundry. No rude workman need take these remarks as an apology for clumsiness or want of skill; a cylinder bored in this way requires more careful attention than one bored with a round-edged cutter. Very many workmen resort to the use of blocks of hard wood in the boring heads to prevent chattering or jarring of the cutters; when this fault occurs it is a proof that either the bar is too weak, or else that the cut is too heavy, other things may cause it, but these are the chief. It is therefore better to dispense with the pieces of wood, for the reason that they are liable to force the tools in to the metal. When the blocks run over little chips, the wood is either torn out or else the cutter is driven into the cylinder; they also heat the cylinder, and, in short, are more fruitful of injury than of benefit.

Some shops, when boring cylinders, ship a cross in each end of the casting through which the boring bar is thrust; the weight of the cylinder hangs on the bar, and the rectitude of the bore depends on the rigidity of the bar, the correctness of its revolution, and the fit of it in the centers or crosses. It is needless to say that no cylinder can be bored true with such an apparatus as this; the interior will resemble the barrel of the Irishman's musket, which was made to shoot around corners. When the tool arrives at the bottom of the cylinder it will certainly force the casting hard down on the top of the bar, and when the tool arrives at the top, of course the reverse will prevail; the casting will be driven up towards the bottom of the bar. It is then apparent that the bore of the cylinder will be a true copy of the orifice in the cross, through and in which the boring bar works; as the weight of the cylinder tends downward, it will soon wear the cross oval, and the evils complained of will be observed. We have seen cylinders of twenty inches diameter and five feet st[illegible], bored out in this way, but hope never to see another one so finished. Let us add, in conclusion, that all tools and equipments, of whatever kind, used in boring cylinders, should be true and correct in shape, the bars should run absolutely true, and the cutters should be of that shape which experience has shown to be the best for the purpose. The work will be done better and more expeditiously when such practices are observed, than when the reverse obtains.

## HAIR AND WOOL---THEIR NATURE AND USES.

The hair, wool, fur, horn, hoof and nails of animals are identical in composition. The surface of all animals is covered with a delicate membrane called the *epidermis*, which contains a great number of little cells. It is this part of the human skin which swells and separates when a blister is applied to it. The epidermis produces hairs in animals, feathers in birds and scales in fish; and it is remarkable that the horns and hoofs of animals are formed of condensed collocations of hairy substances. There are little depressions or cells in the skin which are called hair follicles and are filled with an oily substance. Little blood-vessels supply the lower part of these follicles and cause the cells to grow faster at the bottom, and thus the hairs are gradually pushed out and made to grow. Warts and corns are caused by an excessive secretion of these cells. Different animals produce hair of different qualities, for which specific names are employed to denote their character. Wool is simply a species of hair; it is called wool because it has a tendency to curl. We call certain races of mankind "wooly-headed" because their hair is exceedingly crisp and curly. Certain animals also yield wool or crisp curly hair. Wool, however, possesses peculiar qualities not belonging to straight hair. The former can be felted; most of the latter cannot. The wool of the sheep is valuable for making cloth just in proportion to its curling and felting qualities. It is important to know how to judge wool with respect to this property for making cloth. This can be done with the microscope, because the outward structure of wool and hair is different. If a human straight hair is placed under the microscope it will be observed that its exterior is composed of scales which overlap one another. On the other hand a piece of wool placed under the microscope presents a serrated surface. The fineness of serratures in wool determines its character for the manufacture of different fabrics. The finest Saxony wool contains 2,720 serratures to the inch, and this wool is used to make superfine broadcloth. Merino wool contains 2,400 serratures to the inch, and is also well adapted for making fine cloth; but Southdown and Leicester wool contains only from 2,000 to 1,800 serratures to the inch. It appears that the quality of felting depends entirely on these fine serratures becoming interlocked during the felting operation. Woolen fabrics are woven loose, but one kind is converted into cloth of close texture by the felting process, while another is called worsted, because it is made from wool which does not felt well. The felting property in wool is always in proportion to the number of the serratures. The larger wool contains the fewest, the short curly wool contains the greatest number of serratures. The long wools are therefore prepared for making worsted goods; the short wools for fine cloth. Stockings and flannel made of long wool do not "full up" like those formed of short wool, but the latter make the softest and warmest articles for wearing. Seamless felted garments cannot be made of long coarse wool, which is devoid of the felting property.

Pulled wool is that which is pulled from the pelts of slaughtered sheep and lambs, but most of the wool in market is shorn from the animals in the spring and in some countries semi-annually. Sheep will molt and shed their coats annually, but the molting process is obviated by shearing off the fleeces. Each domestic sheep annually yields its coat to clothe some human being. Man should thus be taught humility by his dependence for warmth upon the animals of a lower creation. All the wool in a fleece is not of the same length and cannot therefore be employed indiscriminately in making cloth. Short wool sheep have some long wool in their fleeces, and long wool sheep have some short wool. Assorters, called wool-staplers are employed to pick out the different qualities of wool. In its natural state wool is dirty, and requires to be washed to fit it for carding, but it is afterwards sprinkled with oil to adapt it for spinning. When it is dyed in the wool condition for the purpose of making cloth, all the grease is first removed by steeping it for a short period in alkaline lye or in a solution of soap, after which it is washed in water and then colored. Saxony wool is admitted to be the best in the world for spinning, but Spanish merino is scarcely inferior to it. Australia and South Africa now produce vast quantities from acclimated breeds of the Saxony sheep. The climate of California is peculiarly adapted for the raising of Saxony and merino sheep, and large supplies of wool are now obtained from the Pacific regions. Very fine wool is also raised in some of our Northern and Western States; but sufficient quantities are not raised to manufacture all the woolen and worsted fabrics required in the United States. In the absence of an adequate supply of cotton a far greater quantity of woolen fabrics are required, and we see no reason why the wool crop and the woolen manufactures of our country cannot and should not be quadrupled within two or three years. We can raise wool of the finest qualities, and cloth of the finest quality can be manufactured in America as well as in Europe. It is not positively necessary that any woolen cloth should be imported. We have heard it asserted that the climate and the waters of the United States are not so suitable for spinning, weaving and dyeing wool as those of Europe. This is sheer nonsense. Very beautiful and good cloth and shawls are now made in some of our manufactories, but not to an extent that meets all the re-

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quirements of the people. England is a great woolen cloth manufacturing country, but English sheep do not yield fine wool. Australia, the Cape Colony, Germany and America furnish English manufacturers with their fine wool. America can and should supply itself with all its wool and woolen cloth.

## MISCELLANEOUS SUMMARY.

A FRENCH work recently published maintains that every 10,500 years, the waters of the sea pass from one pole to the other, submerging and overwhelming in their passage the earth and all its inhabitants. According to the author of this theory, M. Paul de Jouvencel, the last of these deluges occurred 4,500 years ago; the next one is due in 6,000 years more. M. Jouvencel recounts this great cosmical drama with the vigor and pictorial effect of an eye-witness. Six thousand years—sixty centuries—then, only, are left to us wherein to do our whole world's work, and to complete and perfect that civilization which has yet hardly dawned on the greater number of mankind! Sixty old men may touch hands across the interval between the present moment and the last hour of the world as it exists; then all will be finished, all, consumed, all will disappear! The sea for 10,500 years in its immeasurable depths will crush out our history and leave nothing of it all but a few fossils!—so, at least, says M. Jouvencel.

EFFECT OF SHOT ON VESSELS.—A shot does not make a hole of its own size right through the wood, but indents it, the fibers springing back after the shock. Generally the course of a shot can only be traced with a wire, sometimes with a hole as large as a man's finger. The damage most often happens on the inside of a vessel, in splintering and breaking the wood, after the main force of the shot is spent. The guns of Forts Hamilton and Richmond, in the harbor of New York, about a mile apart, with a vessel lying between them, could not send a shot through two feet of that ship's timbers. There is rarely an instance where a ship was sunk by a solid shot. Hot shot and shell do the mischief. The latter will sometimes make apertures of several feet through the sides of vessels.

WHOLESALE PRICES OF DRY GOODS.—Standard heavy Sheetings 45 cents; medium, 44 cents; light, 41 to 42 cents; heavy Shirtings, 35 cents; light, 27½ cents, all net cash. Fine Bleached Goods have sold at full prices; 4-4 range from 40 to 42½ cents. Drills, 40 to 42½ cents. Printing Clothes at 19 cents for 64 by 64. Cambrics range from 17 to 20 cents. Cotton Jeans are quoted at 25 to 35 cents. Ginghams sell at 30 cents. Fancy Cassimeres, $1 75 to $2. Satinets, $1 10 to $1 12½. In Doeskins, low grades are advanced to $1 25 and $1 37. Printed Delaines are 32½ to 35 cents. Cotton Flannels are quoted at 27½ to 45 cents. Stripes, 25½ to 35 cents. Ticks, 24 to 62½ cents. Denims are quoted at 29 to 40 cents.

REMOVE YOUR RINGS.—All persons who are so fortunate, at the present time, as to possess jewelry, should see to it that they do not injure it by careless usage. Precious stones in rings, more particularly colored ones, are customarily set with a piece of foil behind them to highten the brilliancy of their refractions; this foil is liable to be damaged, when the hands are washed, by the soap and water insinuating itself between the foil and the stones. Always take off your rings then, when washing, and they will preserve their beauty and transparency for a much longer time than they will if the opposite course is pursued.

FLYING MACHINE.—M. de Groof, of Bruges, asserts that after eleven years' study he has invented the means of flying in the air in any direction, and needs only money to demonstrate it beyond question. The machine is small, he says, and will enable a man to move in the air "with the swiftness of the swallow and the vigor of the eagle." He asks for aid from England.—*London Builder.*

What next?

THE "GEORGE GRISWOLD."—The international-relief ship, *George Griswold*, has arrived at Liverpool; she was received with salvos of artillery from the forts, and, decorated with flags, was towed up to the city amid universal rejoicing. The authorities intended to give the officers a public reception at an early date.

CHARACTERISTIC BENEVOLENCE.—Nearly $600 have been raised for the widows of the men who lost their lives by the late accident on the *Keokuk*. This sum has been subscribed by the mechanics of Dry Dock, this city—a generous and open-handed class who never refuse to aid those whom the chances of the trade have thrown upon their mercy. Mr. J. S. Underhill, of the Dry Dock Iron-works, has very generously assumed the funeral expenses of the men who were killed.

THE Bath (Maine) *Sentinel*, gives an account of Winnegance—a cozy little village about three miles south of the center of the city of Bath, situated on the Bath and Phipsburg sides of the Winnegance Creek. There is a dam running across the creek, on which are some seventeen saws, capable of turning out 600,000 feet of lumber a year, besides two other mills on another "privilege." These are tide mills that may be kept running about twelve hours in twenty-four, the time being regulated by the tide.

BENZOIC ACID MADE FROM ANILINE.—At the Royal Institution, London, Dr. Hoffman lately described a series of experiments illustrating the artificial formation of benzoic acid from aniline. It is found that when aniline, $C_{12}$ $H_7$ N, is passed through a red-hot tube, it yields a certain proportion of benzo-nitrile, the formula of which is $C_{14}$ $H_5$ N; and further, that when this is boiled with potash, benzoic acid is formed, which unites with the potash, forming benzoate of that alkali.

THE editors of the Chicago *Tribune* have been shown a sample of the short Tennessee upland cotton, raised by J. A. Bent, Hoyleton, Washington county, Ill., upon the line of the Illinois Central Railroad. Mr. Bent's crop was at the rate of 200 lbs. ginned, to the acre. He states that, this spring, if the seed can be procured, a large amount of land will be devoted to cotton culture.

ON the 25th ult., 30,000 tuns of Scranton coal were sold by auction in New York at prices as follows:—2,000 tuns of Chestnut coal $5 92½, $5 87½, $5 90 per tun; 6,000 tuns of Stove coal $5 92½, $5 90, $5 70 per tun; 3,000 tuns of Egg coal $5 37½, $5 25 per tun; 18,000 tuns of Steamboat (Lump and Grate) average $5 10.

THE PACIFIC RAILROAD GAGE.—Congress has passed the bill respecting the gage of the Pacific Railroad, fixing it at 4 feet 8½ inches—the common narrow gage. We understand that this overides the decision of the President (to which we lately alluded in the SCIENTIFIC AMERICAN) which fixed it at five feet.

ONE of the results of our Murfreesboro victory was the capture of the Confederate tannery in that city, embracing a vast amount of hides and partly-tanned leather, sheep pelts, &c., amounting to 7,000,000 pieces and worth more than $1,500,000.

GOING DOWN.—The price of white paper is moderating. That for newspaper use is now offered at sixteen cents. Holders of rags and other stock might as well "stand from under."

A COTEMPORARY instances a genius on Lake Champlain who takes a pair of skates and writes a four months' bill on the ice with such perfection that in less than an hour the sun liquidates it.

A WRITER on natural history gives the following definition of a ram: "A ram is an animal whose butt is on the wrong end of him."

### Disappointment and Success.

When poor Edmund Kean was acting in barns to country bumpkins, barely finding bread for his wife and child, he was just as great a genius as when he was crowding Drury Lane. When Brougham presided in the House of Lords, he was not a bit better or greater than when he had hung about in the Parliament House at Edinburgh, a briefless and suspected junior barrister. When all London crowded to see the hippopotamus, he was just the animal he was a couple of years later, when no one took the trouble of looking at him. And when George Stephenson died, amid the applause and gratitude of all the intelligent men in Britain, he was the same man, maintaining the same principle, as when men of science and of law regarded him as a mischievous lunatic, the individual who declared that some day the railroad would be the king's highway and mail-coaches would be drawn by steam.—*The Country Parson.*

### Nickel Cents.

The *United States Gazette* (Philadelphia) says:—

"The mint is now running its entire force upon nickels. The cost of making this insignificant coin is nearly as much as the cost of making double-eagles. The only difference is that the latter coin is weighed and adjusted, piece by piece. The nickels are exempt from any such close manipulation. The labor daily done at the mint, if expended upon double-eagles, would produce $40,000 per day. Upon nickels, as it is now expended, the results are but about twenty-five hundred dollars per day in nickel. When the currency question is regulated and specie comes forth from its many hiding-places, nickel cents will be like the locusts of Egypt. They will be so abundant as to constitute a nuisance. Except for convenience in doing retail business, they are of small value. In small sums each nickel represents the hundredth part of a dollar, yet it is not intrinsically worth even that. Nickels cannot be used as legal tender, nor for exportation, yet a fictitious value is given to them by speculation that is really culpable. To produce them in sufficient quantities, the nickel-coining machinery of the United States mint is running even into over-hours."

### An English Petroleum Oil Company.

A new association is just announced in London, styled "The Petroleum Trading Company," with a capital of half a million of dollars, and power to increase it to a million. The shares number ten thousand, at fifty dollars each; five dollars to be paid on application, and five more on allotment. The prospectus announces that "the company have taken over the business of the largest importers, and the co-operation of the Atlantic and Great Western Railway is secured." The object is said to be to import into Europe the crude oil, chiefly from the Pennsylvania wells, to which end iron-tank vessels, especially built for the purpose, are to be used, two of which are now in course of construction. It is said that three refineries alone in England now require an annual supply of five millions of gallons, and that the demand is constantly increasing. The managing director, Thomas W. Kinder, Esq., has lately returned from a visit to America.

### Rags.

It is a curious fact that nearly two-thirds of the rags annually imported into the United States from all foreign countries come from Italy. The circumstance is due to two causes:—First, Italy is in fact the receptacle of all the old rags in the Levant. The Turks, the Greeks and Syrians use vast quantities of cheap cotton cloth; and the Archipelago and the whole Levant are swept by Greek and Italian coasting smacks, about the size of our American clam boats, trading for rags which country peddlers collect. These rags ultimately get to Genoa, Trieste, &c., and are shipped to America. Second, there being no free press and few books printed, there is no home demand to work the rags up into paper. The population can neither read nor write, and of course epistolary correspondence is rare. No country where the mass of the population read and write can afford to export rags. Hence, rags and custom-house returns yield a clue to the actual state of society.

### Effects of Light on Animal Life.

Light has an undoubted influence on the growth of some of the lower animals. Animalculæ grow, in water, much more readily in the light than in the dark. If equal numbers of silkworms be exposed in a light room and a dark one, many more larvæ will be hatched from the former than the latter. Dr. Edwards found that the development of tadpoles into frogs may be prevented by the absence of light. They only grow into big tadpoles. Several facts tend to the belief that the human body is greatly amenable to the influence of light. Persons living in caves or cellars, or in dark streets, are apt to produce deformed children; and the workers in mines are liable to disease and deformity beyond what could be accounted for by the condition of the atmosphere. It has been affirmed by Sir A. Wylie that, in a large barrack at St. Petersburg, Russia, the cases of disease in those men who have lived on the dark side for many years are three to one compared with those on the light side.

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## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

*Mica Chimney Lamp.*—The mica lamp chimneys hitherto invented have all been of conical or cylindrical form, or of elliptical or other curved form in their transverse or horizontal section, resembling somewhat the glass chimneys. The curving or bending of the mica, in order that it may assume or have the proper curve to suit the form of the aforesaid chimneys, causes the inner laminæ, that is to say, that at the concave side of the mica, to become corrugated and also to split and shell so as to produce interstices for small unconsumed particles of carbon to lodge in, and in a short time the mica becomes much discolored and nearly opaque so as to render the chimney entirely worthless, for the mica cannot be cleaned without shelling off the layers or laminæ and making holes entirely through it. This contingency renders the mica chimneys, as hitherto constructed, a failure. When first introduced they met with a ready sale, but now there are but few manufactured, and they will probably soon cease to be used at all. This invention consists in constructing a mica chimney with a frame arranged in such a manner that the mica may be inserted in it in flat slabs or planes, whereby the laminæ of the mica will not be disturbed or disarranged in the least on either side and a clear transparent medium obtained for the transmission of the light, and one which will admit of being cleaned or washed without injury. W. P. Ware, of No. 183 Seventh avenue, New York city, is the inventor of this improvement.

*Purifying Gas by Iron Ore.*—This invention, which has been introduced with great success in almost all the gasworks in Denmark, is based on the following process:—The hydrated peroxide of iron decomposes the ammonium and sulphureted hydrogen contained in the gas, and forms sulphuret of iron, and therefore the gas is purified from sulphur just as well as by the use of lime. This method has the advantage that, as the peroxide of iron combines with sulphur, even when the gas is hot, it is not necessary to use a condenser, and if the purifiers are large enough, not even the scrubbing or cleaning with water is required, which is of great importance as the gas will lose much of its illuminating power by a too-quick condensation and its coming in contact with water; the accumulation of naphthaline is also diminished. The purifying material can be used over and over again as long as there is anything left of it. When the material in a purifier is spent, it is placed in a receptacle with a water-tight bottom and washed out with the gas or ammonium water, which is poured over the material by a hose. After having passed through the water is conducted to a water-tight tank. By this process the sulphur combines with the iron; and when evaporated, sulphate of ammonia will remain. The following statement obtained from the Copenhagen gas works will show the advantage of this invention. The coals used were New Pelton, Lesmahago cannel and Boghead cannel:—One tun of coal gives 10,000 feet of gas; at the same time are obtained 16 lbs. of the sulphate of ammonia; quantity of gas manufactured last year, 160,000,000 cubic feet of gas, and at the same time 256,000 lbs. of sulphate of ammonia; this latter was sold at $6 per 100 lbs. or $15,360; the cost of producing this salt, not including the operatives in the purifying house, as they are also used in the ordinary purifying method—for two men, per day, $3.50; one stoker, per night, $2; coal for evaporating, $2,25; 120 lbs. of sulphuric acid, $1.25—total, $9. The quantity of sulphate of ammonia thereby produced, was 500 lbs. at a cost per 100 lbs. of $1.80. This shows that while the present mode of purifying gas is expensive, by this improved process an actual profit arises. The expenses for altering gasworks to suit this new purifying method are very small on works where dry-lime purifiers are used, as these can be altered with a trifling outlay. This purifying process is the invention of J. C. G. Howitz, gas engineer at Copenhagen, Denmark, and further information in regard to it can be obtained by addressing Mr. L. Hein, care of J. O. Baker & Co., 87 Wall street, New York.

## ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MARCH 3, 1863.

*Reported Officially for the Scientific American.*

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

37,798.—Apparatus for Distilling Coal Oils.—J. L. Alberger, Buffalo, N. Y.:

I claim the employment, simultaneously, within an oil-distilling retort, of a steam-supplying and a steam-heating system of pipes, substantially in the manner and for the purpose herein shown and described.

[This invention consists in so combining a steam coil and a steam pipe to a retort and condenser, that the oil in the retort can be heated and evaporated simply by the application of steam and without coming in direct contact with the fire, and that the vapors of the oil and the steam are condensed simultaneously, thereby freeing the oil from its bad odor and from the impurities mixed with it.]

37,799.—Boat-detaching Hook.—W. W. Andrews, Warrensville, Ohio:

I claim the combination in a mechanical apparatus, of the hook, B, shoulder, B″, stud, I, lever, E, spring, G, catch, F, and dog, C, the several parts being arranged substantially as and for the purpose herein specified.

37,800.—Drying Grain.—John Babillion, Detroit, Mich.:

I claim the employment of several floors, arranged one above the other, and so constructed that the sections composing the floors can be dumped, and the grain fall upon the floor below, thereby admitting the grain in process of drying to a series of relays, and when dried, of ready transmission from the machine by tilting the floor, B, substantially as described.

37,801.—Refrigerator.—A. H. Bartlett, Spuyten Duyvil, N. Y.:

First, I claim the corrugated metallic ice and water box, constructed and combined with the trough, K, the pipes, Z and H, the faucets, I and J, or their equivalents, and made and arranged substantially as and for the purpose shown and described.

Second, I claim the combination and arrangement of the ice chambers, F and W, the plank, Y, the reservoir, G, the pipes, Z and H, the faucet, I, or their equivalent, whereby the ice meltings from the chamber, W, can be either conducted into the reservoir, G, and retained with the water therein, or the whole allowed to pass off through the faucet, I, and opening, X, substantially as and for the purpose shown and described.

37,802.—Valve for Steam Engines.—John Baird, New York City. Patented in England, June 21, 1862:

I claim, first, The combination of a valve with parallel faces with a seat and a face plate, all operating substantially as described, by means of keys supporting the face plate and permitting its adjustment, substantially in the manner specified.

Second, I claim, in combination, keys to support a face plate, springs to hold the latter in contact with the former, a face plate and a sliding valve with parallel faces, the combination being substantially such as specified.

Third, In combination with a slide valve and equalizing recesses or pockets, substantially such as described, I claim apertures through the valve itself, which, at the proper time, make a connection, substantially as specified, between a passage for steam or exhaust and a recess or pocket, for the purpose specified.

37,803.—Manufacture of Zinc.—Frederick Bennett, Bagillt, England:

I claim the use or employment of a chloride or compound of chlorine in the manufacture of zinc, by mixing it with the calcined ore and with the carbonaceous matter in the smelting retorts, substantially in the manner set forth.

37,804.—Ironing Stand.—J. T. Bever and Marie L. Bever, Springfield, Ill.:

We claim the combination of leaf, F, with the frame, D D, and slides, H H, poles, J, and cords, K, when arranged with the receptacle for clothing or mattress, substantially as and for the purposes set forth.

37,805.—Car Coupling.—G. S. Bishop, Washington, D. C.:

I claim, first, The construction of the latch or coupler, A, with its foot, E, spur, D, and wide arm, B, in the manner and for the purpose herein set forth.

Second, I claim the stirrup, F, and step, K, in combination with the latch, A, with its foot, E, and spur, D, as and for the purpose herein described.

37,806.—Device for converting Motion.—H. H. Bishop, Bristol, Conn.:

I claim the combination with the fly-wheel and its hub, b, made as represented, of the two arms, e e, of unequal length, the two pulleys, D D′, of unequal interior diameters, the cords, h h, and the hook-armed treddle, E, the whole constructed and operating in the manner herein shown and described.

[This invention consists in the arrangement of a treddle with two hooked parallel arms in combination with two pulleys provided with tangential driving arms, or any other similar device, and set to turn the fly-wheel shaft in one and the same direction, in such a manner that by the action of the oscillating treddle on the two pulleys a positive continuous rotary motion of the fly-wheel is produced.]

37,807.—Means of affixing Defensive Armor Plates.—Edward Brady, Philadelphia, Pa.:

First, I claim protecting the sides, decks or other parts of vessels or fortifications, with metallic plates, secured edgewise thereto by means substantially as herein shown and described.

Second, I claim securing the said plates by means of bolts or other fastenings applied to or within apertures or cavities formed in the inner edges of the said plates, and enlarged within the body thereof or intersected by transverse apertures in any way, substantially as explained.

37,808.—Dumping Tubs.—W. H. Brown, Erie, Pa.:

I claim the skip or tub balanced and restrained, substantially as described, and dumped when required, in the manner and for the purpose specified.

37,809.—Setting Artificial Teeth.—J. W. Chapman & W. Z. W. Chapman, New York City:

We claim the construction and employment of a plate of metal or other suitable substance, as herein described, between the teeth and the gums, in the manner and for the purposes set forth, detached from and independent of said teeth, said plate conforming to the irregularities of the base of the teeth and the surface of the gums, substantially as herein specified.

We also claim uniting the base or saddle plate with the teeth, as and for the purposes set forth, so that said plate and teeth can be readily separated for repairs or otherwise, as herein described.

37,810.—Wool-packing Device.—Wm. A. Davis, Salem, Ohio:

I claim, first, The hinged side pieces, E E, of the platform, D, provided with the bars, F, and used in connection with the bars, G G′, or their equivalents, to serve as stops for the bars F, to retain the side pieces in a vertical position, as set forth.

Second, The arrangement of the bars, G G′, connecting rod, H, spring, i, rod, I, crank shaft, J, and levers, h J′, substantially as shown, for the purpose of raising the side pieces, E E, to a vertical position, and releasing the same so that they may be turned down to a horizontal position as herein described.

Third, The cords, b, placed on the spools, a, in connection with the spikes or teeth, t, when said parts are used in connection with the slotted packing strap, P, as and for the purpose specified.

Fourth, The packing strap, P, attached at one end of the platform, D, in combination with the roller, K, and bearing plate, O, as and for the purpose herein set forth.

[This invention relates to a new and improved machine for packing wool in the fleece, and consists in the employment or use of a table provided with folding sides arranged in such a manner that they may be adjusted with the greatest facility in order to place the wool properly in the packing-shop. The invention also consists in a novel arrangement of the cords by which the wool is bound, in order to facilitate the adjusting and tying of the same around the wool when packed; and the invention further consists in an improvement in the packing strap, the construction of the same and the manner in which it is applied to the working parts.]

37,811.—Vapor Lamps.—Timothy Drake, Windsor, Conn.:

I claim the combination of the heaters, n n, chamber, k, diaphragm, h, and vaporizing chamber, a, substantially in the manner as and for the purpose described.

Second, I claim the heaters, n n, with the interior perforated diaphragm, h, substantially in the manner and for the purpose described.

37,812.—Dove-tailing Machine.—H. J. Hale and H. J. Hale, Jr., Indianapolis, Ind.:

We claim, first, The arrangement of the vertical or oblique cutters, l l, the walking beam, C, having the slot, e, and the pitman, K, by which the depth of the cut is regulated, in the manner described.

Second, We claim controlling the direction of the cutters, l l, by means of the adjustable grooved plates, f f, constructed and arranged with reference to the slides, k k, substantially as described.

37,813.—Harvester.—George Engle, Bunker Hill, Wis.:

I claim, first, The truss, or suspension draft frame, for a reaper or mower, constructed substantially as set forth.

I claim, second, The arrangement of the driver's and the raker's seats, in the relation to each other shown, and with respect to the platform and the tongue of the machine, and upon the truss frame and standards, G G′, substantially in the manner described.

I claim, third, The combination of the angular bracket, P, or its equivalent, and the hangers, M M, applied and operating substantially as described.

I claim, fourth, The suspending and adjusting screw, Q, applied and operating substantially as described.

I claim, fifth, The combination cable, k2, and the arms, i i, and bracket, P, substantially as and for the purpose set forth.

I claim, sixth, The hangers, M M, when used as guides for loops of the arms, i i, substantially as described.

I claim, seventh, The arrangement of the bar, N, with respect to the main frame and gearing, substantially as set forth.

I claim, eighth, The adjustable skeleton triangle divider, made in one piece, in combination with the deflecting board, Y, as set forth.

37,814.—Journal Box for Car Wheels.—R. J. Hamilton, Chicago, Ill.:

I claim the combination and arrangement of the adjustable collar, A, and the washer, C, when cut, as described, and both are operated upon and used with the springs, a and c, or their equivalents, and the openings, g and f, when all are arranged and operating substantially as and for the purposes delineated and set forth.

37,815.—Composition for Purifying Gas.—J. C. G. Howitz, Copenhagen, Denmark:

Iclaim the employment or use of the within described composition of iron ore and spent tan or sawdust mixed together in about the proportion herein specified for the purpose of purifying coal gas substantially in the manner set forth.

37,816.—Machine for Sawing Bevels.—Hutson E. Hughes, Cincinnati, Ohio:

I claim, first, The arrangement of the movable arbor frame, H, supported in bearings at one end and adjustable at the other in the manner and for the purpose set forth.

Second, I also claim the movable table, B, with the beveled slot, L, when it has a transverse motion in relation to the saw for the purpose herein described.

Third, I further claim the combination of the movable arbor frame, H, with the quadrant, I, and transverse moving table, B, vertical sliding frame, D, substantially as and for the purpose set forth.

37,817.—Marine Battery Ram.—John F. H. King, Port Richmond, N. Y.:

I claim the use of a submerged thrusting or striking bolt or ram for penetrating the bottom or sides of a vessel of an enemy, when actuated and receiving its reciprocating motion substantially as and for the purposes described.

37,818.—Machine for moving Railroad Cars.—C. W. Theodore Krausch, Chicago, Ill.:

I claim, first, A lever-traction truck, substantially as described, and for the purpose set forth.

Second, The providing of a truck which has two wheels, with the suspended platform and the jaws, d d, or their equivalents, substantially as described.

Third, The providing of a truck which has two wheels and a lever frame, with gearing as described, for the purpose set forth.

Fourth, Tongued washers in combination with the grooves in the wheels of a truck operating as described, for the purpose set forth.

37,819.—Clothes-dryer.—Ira Lynde, Marathon, N. Y.:

I claim the arrangement of the wheeled line-carrying clothes frames, C (one or more), in combination with the sectional grooved elevated track, A A′, constructed and operating in the manner and for the purpose herein shown and described.

[This invention consists in the arrangement of one or more wheeled line-carrying clothes-frames in combination with a grooved sectional track elevated on posts in such a manner that said wheeled clothes frame or frames can be readily taken down from the track whenever the clothes-dryer is not used or put up, and supplied with clothes when the dryer is to be put in use, and that two or more such clothes frames can be connected together and drawn in or pushed out on the track as may be required during the operation of drying the clothes.]

27,820.—Hydrant.—John McClelland, Washington, D. C.:

I claim the sliding valve, C, with its slotted arm, F, and the crank or eccentric, D, with the cap or cover of a hydrant or fire-plug, in the manner herein described for the purposes set forth.

37,821.—Machine for Cutting Square Threads of Wood Screws.—Joseph A. Montgomery, Columbus, Ohio:

I claim, first, Cutting screw threads with vertical or square edges, on wooden blanks by means of a rotary tool.

Second, The combination of a rotary and hinged tool on the one stock or slide rest, substantially as described and for the purpose set forth.

Third, The construction of the periphery of the rotary tool substantially as described.

Fourth, The combination of the rotary tool, hinged adjustable V-shaped tool and the turning off bit or tool, with the slide rest, substantially as described.

Fifth, Setting the shaft of the rotary tool oblique with respect to the centers of the lathe, substantially as set forth.

Sixth, The combination of the two driving belt pulleys or drums, with the tools for turning off the bench screw blank, cutting V-threads on the same, or for cutting the square or perpendicular edged screw threads, substantially as and for the purpose set forth.



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37,822.—Pressing and Polishing Metal Vessels.—John Neuman, New York City:

I claim the employment or use, in combination with a lathe and mandrel, of a lever, C, provided with a steel or other hard metal roller, P, applied to a slide rest or other equivalent feed mechanism in such a manner that the latter will properly feed the lever and roller along while the same is pressed against the vessel, G, on the mandrel, and also serve as a bearing or fulcrum for the lever, substantially as and for the purpose herein set forth.

[This invention is designed to supersede the ordinary land process of beating or hammering cylindrical vessels constructed of coppered and doctile metal compositions, which is done in order to compact and render the metal firm and stiff and also to polish the same after being annealed and soiled in the process of beazing.]

37,823.—Stop Motion for Drawing Heads.—Benjamin O. Paige, Lowell, Mass.:

I claim my improved or positive stop motion or mechanism; the same consisting of the tripper, A, or its mechanical equivalent, combined with a lever latch, z, and so applied to the upper calender roller as to revolve with it or be revolved by its shaft and be thereby caused to operate in manner and under circumstances substantially as hereinbefore specified.

37,824.—Refining Sugar.—Herman G. C. Paulsen, New York City:

I claim the application of alcoholic vapors of the temperature and for the purpose as herein stated to refine crystallized sugar.

37,825.—Numeral Frame.—John Hermann Rudolph Reffelt, Hoboken, N. J.:

I claim the division of the balls used into sections of compartments denoting units, tens, hundredths and thousands (or any denominations desired); and the use of sliding pieces of various proportionate lengths, to denote fractions.

37,826.—Pump.—Andrew J. Reynolds, Dayton, Ohio:

I claim, first, The hollow piston, D D′ E F f, containing the double acting disk valve, C′′, within the said piston; the whole being constructed and operating in connection with a double-acting pump cylinder or its equivalent; substantially as set forth.

Second, I claim the arrangement of bolts, N N′, serving the two fold purpose of pivots and set screws, the collar, O, bell crank, K L M M, and pedestal, H I I, the whole being combined with and serving to operate a water-discharging piston rod, D′, in the manner set forth.

37,827.—Box Machine.—George P. Roberts, St. Louis, Mo.:

I claim, first, The employment of the adjustable gage stocks, C, in combination with the plate, B, all being constructed and arranged to operate substantially as and for the purposes set forth.

Second, The spring clamps, g, constructed and arranged to operate substantially as herein described in combination with the stocks, C, as and for the purposes set forth.

37,828.—Conduit Pipe.—Wm. S. Sampson, New York City:

I claim forming tubes or cylinders for water pipes, cisterns, &c., of tongued and grooved (or otherwise equivalent-shaped) bricks and iron bond-plates and tie rods, in combination with a composition or cement lining covering the iron work, substantially as and for the purposes herein before set forth.

37,829.—Grading and Dressing Roads.—George W. Sayre, Pisgah, Ohio:

I claim, first, The combination of the scraper, A, with beam, C, angle brace, d, hinged brace, E, and levers, G G′.

Second, The plough, P, in combination with scraper, A, when constructed as for the described purposes.

Third, I claim the above-described machine when combined, arranged, and constructed as and for the purposes set forth.

37,850.—Percussion Apparatus for Explosive Shells.—John J. Schillinger, Washington, D. C.:

I claim, first, Dividing the interior space of a shell or the hollow part of a projectile into two separate chambers, one containing the charge of powder, the other containing a plunger, when the said plunger is secured to the shell as hereinbefore specified.

Second, Fastening the said plunger to the end or rear part of the shell or projectile by means of a combustible cord, in the manner and for the purpose, substantially as herein described.

37,831.—Grading Machine.—Wm. Spalding, Port Henry, Ohio:

I claim, first, The arrangement of rods, a a b b, in combination with staples or eye-bolts, c d, for attaching a plow and scraper combined, as described, to the axles of an ordinary farm or lumber wagon, thereby adapting said wagon to use as a grading machine as specified.

Second, The pivoted lever, H, segment rack, I, and chain, e, in combination with the eye-bolts, c d G, rods, b b, and screw-winch or lever-nut, J, for raising and lowering or adjusting the inclination of the plow and scraper combined, when connected with a wagon in the manner substantially as described.

[The object of this invention is to enable the farmer or other person having an ordinary farm or lumber wagon, to adapt it with but little outlay and without lessening its value for all the purposes for which it is otherwise calculated, to use as a grading machine for the making or repairing of common or turnpike roads. An engraving of this invention will appear in our columns in two or three weeks.]

37,832.—Register for Gas and Water Meters.—John J. Squire, New Haven, Conn.:

I claim the above-described arrangement of the cams, levers, and shields when applied to gas or water meters as and for the purpose herein set forth.

37,833.—Water Wheel.—John Temple, Wm. M. Mills & Atlas L. Stout, Middletown, Ohio:

We claim the combination of the curved or concave top flange or rim, A, with the inclined straight flange or rim, B, constructed and operating in the manner and for the purposes substantially as described.

Also we claim the combination of the flanges or rims, A B, constructed as set forth with cyma-reversa or scroll buckets, c, in the manner and substantially as specified.

37,834.—Corn Planter.—William S. Todd, Mechanicsville, Iowa:

I claim the arrangement of the secondary hinged frames, H, forming the bearings for the axles of the wheels, G, in combination with the main frame, A, and driver's seat, F, all constructed and operating substantially as and for the purposes shown and described.

[This invention relates to a certain improvement in the running gear of corn planters, and the invention consists in the arrangement of two secondary hinged frames which form the bearings for the axles of the covering wheels of a corn planter and which support the rear end of the driver's seat in combination with the main frame, the front part of which rests on the runners or furrow openers, and which supports the front end of the driver's seat in such a manner that the covering wheels can adapt themselves to the inequalities of the ground, one independent of the other, and at the same time the driver is enabled to divide his weight equally between said wheels and the furrow-openers or runners, or to shift it towards one or the other at pleasure.

37,835.—Saw.—William G. Tuttle, Geneva, N. Y.:

I claim the employment of alternate, clearing teeth, d d, the ends of which are concave or notched so as to form sharp or pointed corners, in combination with the triangular pairs of cutting teeth, a a′, arranged on a single saw blade, substantially as and for the purposes herein set forth.

37,836.—Defensive Armor Plate.—Maximilian Wappich, Sacramento, Cal.:

First, I claim armor-plates having projections, f, to pass through the side of the vessel, substantially as and for the purpose described.

Second, I claim the projection, k, which is formed on the inside of the flanged armor-plate to clasp the head of the bolt, l, in combination with the bolt, l, when fastened with key, h, in the manner and for the purpose substantially as described.

Third, I claim the combination of the bent ends, and angular projections and notches, m m, with the flanged armor plates, substantially as and for the purpose described.

Fourth, I claim applying to the side of the vessel and behind the armor-plates, backing ribs, d d, in an edgewise position, substantially as and for the purpose described.

Fifth, I claim securing the port-hole by a united ring, r, inside frame, o, and flanged armor-plates, combined substantially as and for the purpose described.

Sixth, I claim providing the adjoining edges of the flanged armor-plate with grooves or recesses, w, in the manner and for the purpose set forth.

37,837.—Mica Lamp Chimney.—W. Powell Ware, New York City:

I claim a mica lamp chimney formed of a frame constructed in such a manner as to admit of the insertion of flat slabs or planes of mica, substantially as herein set forth.

37,838.—Composition for Restoring Colors to Cloth, &c.—John Warncke, Buffalo, N. Y.:

I claim the composition of matter herein described and the mode of applying it, for restoring colors to faded and soiled cloth, substantially as herein set forth.

37,839.—Spoke Machine.—Eli K. Wisell, Warren, Ohio:

I claim, first, Cutting the spokes in longitudinal sections by means of a revolving cutter and a traversing motion of the spoke and pattern, and the rotation of the spoke and pattern by sections in concert with each other, in the manner specified.

Second, I claim the roller, K, upon which the pattern rests, for the purpose specified.

Third, I claim the inclined planes, J J′, in combination with the pawl and ratchet, I I′, when arranged and operating as and for the purpose specified.

Fourth, I claim the finger, P, and rod, T, when arranged and operated as described, for throwing the traverse frame out of gear.

Fifth, I claim the traverse frame, D, and mandrels, F F′ and G G′, in combination with the revolving cutters, arranged and operating as set forth.

37,840.—Razor Strap.—Jacob Wolf, Fort Madison, Iowa:

I claim a razor strap provided with a surface of polished zinc, as and for the purpose herein shown and described.

[This invention consists in the employment or use of a plate of sheet zinc, or other suitable metal, stretched on a frame or handle similar to that of ordinary razor straps for the purpose of sharpening razors and other instruments.]

37,841.—Rotary Engine.—Solomon S. Mecay (assignor to Spencer Mecay), Kilbourne, Ohio:

I claim constructing the drum or propelling cylinder of a rotary, steam, or other motor, with segmental rims, D D D D, having hooked or bent ends, E E E E, so combined and arranged together as to form short compressing channels, F F F F, and exhaust outlets, G G G G, disconnected and remote from the ports, B B, and whereby is acquired an enlarged area of capacity, and an accumulating chamber, I I I I, thereby affording an increased volume of steam, and also avoiding friction, substantially as set forth, shown and described.

37,842.—Machine for Tenoning Spokes.—H. M. Preston (assignor to A. H. Baker), St. Louis, Mo.:

I claim the employment of the cam, F, arranged upon the cylinder, E, or its equivalent in effect, in such manner as to impart to the cutter a reciprocating motion, in combination with its rotary motion, for the purpose of forming oval or flattened tenons for spokes of wheels, substantially as herein set forth and represented.

37,843.—Can or Flask.—Jacob Dunton, Philadelphia, Pa.:

I claim the combination of an outer casing, C, of sheet metal and interposed body, B B′, of cork, wood or analogous material, with a flask or bottle, A A′, in manner herein described and for the purposes set forth.

I also claim the guard, D, applied to the outer casing, C, to protect the neck of the bottle or flask in the manner explained.

[By means of this invention a bottle or flask of glass, sheet metal, or other frail material, is effectually preserved from injury either by concussion, or pressure or the penetration of any pointed body.]

37,844.—Pack Saddle.—Jacob Dunton, Philadelphia, Pa.:

I claim, first, The application of a pivoted beam to a bearing saddle, substantially as and for the purposes set forth.

Second, A pack saddle provided with a beam or beams, constructed substantially as described, and adapted for the suspension of burdens from adjustable points, in the manner and for the purposes herein set forth.

[This invention consists in the application to a bearing saddle of a suspension beam, for supporting either burdens to be carried or the shafts of a vehicle to which the animal may be attached.]

37,845.—Perforation in Lamp Burners.—W. H. Smith, New York City:

I claim a raised perforation, as shown at c, in Fig. 2 and Fig. 3, when used in coal oil and other burners, the whole being arranged substantially as and for the herein-described purposes.

RE-ISSUES.

1,423.—Hay-elevating Fork.—Nelson Palmer, Greenville, N. Y. Patented Sept. 30, 1862:

I claim, first, The hay-elevator formed by the handle, a, head, b, and tines, c, when said tines pass below the head and extend forward for receiving the hay, substantially as specified, whereby said fork will not tip sidewise, when raised by power applied to the head of the fork, and the handle is sufficiently above the bottom of the hay on the tines to allow said handle to swing clear of the hay on the mow or on the cart, as set forth.

Second, I claim the brace or toggle-joint bar, e, in combination with the bail or sustaining bar, and the handle of the fork, as specified, whereby the fork is rendered rigid in lifting the hay, but allowed to swing and deliver the hay when said brace bar is acted upon, as set forth.

Third, I claim the discharging rope, f, and sheave, i, arranged as shown, in combination with the toggle-joint brace, e, fork, a b c, and bail or sustaining bar, d, for the purposes specified.

1,424.—Machine for making Horse-shoes.—C. H. Perkins, Providence, R. I. Patented June 1, 1858:

I claim, first, The method, substantially as described, of making a shoe for animals by the combination of a pair of dies whose office shall be to act upon the whole exterior surface of the blank, and fashion it into a shoe, as specified, one of said dies being an anvil die and the other a moveable hammer die—the two being so constructed and arranged relatively to each other as to fashion the shoe, as set forth, by striking a blow or a succession of blows upon the shoe blank in distinction from the action of dies heretofore used for pressing the metal of the blank into the form of a shoe.

Second, The combination and arrangement of the hammer, K, and the creaser, L, with one rotary tripping shaft, I, so as to be operated thereby, substantially in the manner and for the purpose specified.

Third, The mode of operation, substantially as specified, by means of which the "former," B, is made to take two separate positions with respect to the benders and hammer for the purposes set forth.

Fourth, Combining the straight toe die, b, with the benders, c c, and the "former," B, substantially as described.

Fifth, The combination of a set of notches, or their equivalents, with the rear end or toe of the "former," substantially as described, for the purpose of maintaining the shoe blank in its proper place with respect to the "former," during the process of bending the shoe.

Sixth, In combination with the mechanism described for giving to the hammer shaft a tilting motion, I claim the mechanism described for rotating the shaft at the proper times, in order to bring the hammer and the creaser to operate on the shoe alternately, substantially as described.

Seventh, In combination with the mechanism for tilting and turning the hammer and creaser shaft, I claim the mechanism described for arresting the operations of the tilting mechanism and for preventing the fall of the hammer shaft long enough to allow of a semi-rotation of the hammer shaft, and the withdrawal of the finished shoe from its place about the "former" and the substitution of a shoe blank therefor.

1,425.—Stove.—Dennis G. Littlefield, Albany, N. Y. Patented March, 4, 1856:

I claim the combination of two or more distinct combustion compartments and separate heating chambers, with a single supplying cylinder, or reservoir, substantially as and for the purposes herein specified.

I also claim a grate, B, solid in the central portion and open only in the periphery, substantially as and for the purpose herein set forth.

I also claim a single receiving chamber or flue, M, in combination with separate heating chambers and a supplying cylinder arranged so as to receive and conduct away to the smoke pipe the products of combustion from said heating chambers, and the gases escaping from the supplying cylinder, as well as any air that may enter through the replenishing aperture, P, substantially as herein specified.

1,426.—Stove.—Dennis G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 9, 1861; again re-issued Aug. 26, 1862:

I claim a stove, or furnace, having a supplying cylinder, or reservoir, over the fire-pot, and a chamber for receiving the products of combustion, arranged so as to inclose the cover opening of the supplying cylinder, when the fire-pot is constructed with openings or outlet space to said chamber, sufficient in area to enable anthracite coal and other concentrated fuels to be burned, and to transmit all the products of combustion and generated gases freely to said chamber.

I also claim the combination of a chamber for receiving the products of combustion so arranged as to inclose the cover opening of the coal-supplying cylinder, with a fire-pot which has an aggregate area of openings, or outlet space, to said chamber, exceeding that of the air-supply apertures through the fire-grate below.

1,427.—Stove.—Dennis G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 9, 1861; again re-issued Aug. 26, 1862:

I claim an illuminating exterior case, having its windows, or illuminating apertures, either in its fixed portion, or in any door, or movable part thereof, in combination with a supplying cylinder for reserve coal, and a chamber which receives the products of combustion from the fire-pot.

I also claim a fire-pot having its combustion apertures extending down to the bottom of the casting, and the intermediate bars tapering from top to bottom, substantially as and for the purposes herein specified.

DESIGNS.

1,722 to 1,730.—Nine patents for designs for Carpet Patterns.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass.

1,731.—Design for Metallic Skate.—Robert S. Stenton, New York City.

## Magazines and other Publications Received.

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston, Mass.

The *Atlantic Monthly* is the pioneer of its class in enterprise. The number for March lies upon our table, following closely upon the footsteps of its predecessor. The contents of the present number are as varied and excellent as usual. "The Vagabonds"—a poem—possesses great merit; the sorrows of the idle soldier and his follower are set forth at length, and with a true sympathy for the old wanderer and outcast. "Under the Pear Tree" is continued, and "The Last Cruise of the Monitor" is a simple, unaffected narrative of events which transpired during the storm and subsequent wreck, as seen by an eye-witness. Other excellent papers are contributed, and "the most fastidious person," as the hotel-keepers say, cannot fail to be pleased.

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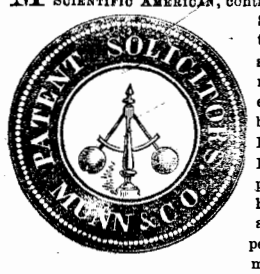


### THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

### PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

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Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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| | |
|---|---|
| On filing each Caveat | $10 |
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During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

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### ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

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### REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

### FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

## Notes and Queries

A. M. B., of Mich.—We have received your remittance and apology, and are much obliged for them. Your explanation is perfectly satisfactory and we shall be happy to give you all the information in our power.

D. S. G., of D. C.—You will find a communication similar in character to yours, on "The Sources and Geology of Petroleum," on page 85, present volume of the SCIENTIFIC AMERICAN.

C. F. F., of Mass.—We have seen a steam engine so diminutive in size that it stood entire upon a space not exceeding the area of a ten-cent piece. It would require diagrams and occupy too much of our space to give a description of the microscope and its construction. Get "Carpenter on the Microscope," or some such work and study it carefully.

C. C. T., of Mich.—You state that when you use sawdust for fuel in the furnace of your boiler, the chimney soon becomes clogged with soot and sometimes takes fire; and you desire to know how this may be prevented. The soot is caused by the imperfect combustion of the sawdust, which involves a loss of heat as well as the danger of a sooty chimney. The remedy for this is to supply more air to the furnace, and if possible warm air. The evil may be cured with careful firing.

J. W. B., of Ohio, asks as follows:—A and B having obtained patents for similar machines, A makes an application for the re-issue of his patent. Do you know of any law or decision of our courts that is a bar to the right of A to an interfering case on the priority of invention with the patent of B, for the reason that the patent of B, in which the invention is involved, dates back more than two years? Answer—No. The statute is mandatory. The interference must be granted.

J. H., of Ky.—The chloride of zinc, so far as we know, is not manufactured upon an extensive scale to be used for washing the walls of rooms. If there was a large demand for it the price would probably be low, as it is not expensive to manufacture.

B. and W. of Mass.—You can treat your cotton waste that is saturated with oil, so as to render it fit for repeated use, by taking one pound of sal-soda and one pound of slacked lime and boiling them together for ten minutes in five gallons of water; then allow the lye to cool and settle, and then run off the clear and throw away the precipitated lime. Now boil the cotton waste in this lye for ten minutes, take it out, wash and dry it, and it will be ready to do service a second time. The oil will combine with the alkali of this soda and form a soap.

D. T. R., of Ohio.—Various substances have been used with success in removing scale from steam boilers. Slippery elm bark, sweet potatoes, molasses, sal-ammoniac, catchecu and oak bark placed in a boiler loosen the scale on it. We advise you to try the slippery elm bark first. Put about a quarter of a peck into your boiler and try its effects for one day, blowing off in the evening Several of our readers have tried it with success. You should purify the water before it is admitted into your boiler, and thus obviate the formation of scale. You may do this by using two large tanks, permitting the feed-water to flow through them and admitting the exhaust steam, so as to boil the water in the first tank. From thence it should flow into the second tank among straw or twigs, upon which it will deposit its carbonate of lime, and thus you will secure soft water for the boiler. The straw which has been used for stable litter contains some ammonia, and is a most excellent filtrating agent for this purpose. By exhausting the steam into the chimney of your boiler you will certainly improve its draft.

L. C. M., of Ill.—Pulverize the prussiate of potash, heat your iron to a cherry red, dust the powder on, return the work to the fire and melt it, then plunge into cold water and your metal will be case-hardened.

R. C., of Ill.—In making soap continue the boiling of it until the alkali and grease have all combined. When it is observed that the grease has not all united, after boiling for some time, add more strong lye. In making soap the proportion of lye is not dictated by weight in soap manufactories.

A. R., of Iowa.—We have carefully read your article suggesting a mode of cutting out piles under water and we do not think it likely to be adopted. There are better plans.

G. W. S., of Pa.—We are not at liberty to give the information you seek in regard to the projectile. The case is now in our hands and must be treated as confidential until the case is effectually acted upon at the Patent Office.

C. C., of Pa.—The device you claim for breaking flax is old. You are therefore advised not to spend money upon it. Better plans are in use for the purpose.

O. P. S., of Ohio.—Since we have declined to publish your libelous advertisements we understand that you are now disposed to drop all further correspondence with us. If we are right in this matter we have reason to congratulate ourselves upon the happy issue. For years past you have bored us excessively with your matters, without profit, and now, if you will drop us from your list of correspondents for all future time, we shall feel relieved. If you will stop writing to us we shall think a great deal better of you.

### Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, March 4, to Wednesday, March 11 1863:—

M. A. D., of Mich., $25; L. B., of Conn., $22; W. W., of Mich. $25; E. & C. A., of Ohio, $25; J. & D. S., of Wis., $33; G. P. H., of N.Y., $16; P. D., of N. Y., $25; G. W. C., of Ill., $25; J. R., of Minn., $25; R. B. D., of Pa., $16; C. & J. A., of Ill., $15; M. B. W., of Conn., $25; A. T. W., of Iowa, $30; C. W. H., of N. J., $25; M. B. D., of Pa., $20; A. C. M., of Ill., 10; A J., of N. Y., $16; P. A. C., of Mass., $20: A. P., of N. Y., $20; C. W. H., of N. Y., $20; L. H. O., of N. Y., $20; E. H. C., of Mich., $20; F. A. De M., of N. Y., $16; R. E., of N. Y., $20; A. C., of Vt., $20; H. B. W., of Mass., $16; P. J. C., of Conn. $25; F. W. H., of Canada, $25; J. W. B., of Ind., $16; D. C. S., of Conn., $30; J. McL., of Ohio, $10; D. M. S., of Vt., $16; D. D. C., of Mass., $25; L. W. P., of Mass., $15; R. McD., of N. J., $16; M. A. W., of Cal., $20; J. Van D., of N. Y., $25; W. H., of Wis., $60; G. C. R., of N. Y., $25; J. E., of Conn., $20; H. & T., of N. Y., $22; G. S., of N.Y., $20; P. D., of Mich., $20; J. C. P., of N. Y., $20; U.P., of Conn., $20; A.B., of Mich., $20; J.O.T., of Ohio, $20; W.M., of Ill., $175; H. B. M., of Pa., $16; T. J. V., of Conn., $29; E. St. J., of N.Y., $16; H. & J., of Iowa, $40; N. Z. P., of Ill., $16; G. G. H. of Ill., $15; R. B., of Cal., $15; H. G. H., of Ind., $25; W. D. G., of Va., $25; P. & P., of Ill., $25; H.Van D., of Mass., $16; E.R.M., of N.Y., $250; J. W., of Ky., $27; A. W., of La., $12; H. & S., of Pa., $20; H. B. of Mich., $46; S. J. S., of N.Y., $41; A. H., of Iowa, $20; W. H. of N.Y., $16; N.A.B., of N.Y., $40; H.D. L., of Mass., $40; P. & C., of N.Y., $20; M. R. S., of N. Y., $20; M. A. J., of Mass., $20; F. W. H., of C. E., $26.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, March 4, to Wednesday, March 11, 1863:—

N. A. B., of N. Y.; A. W., of La.; C. W. H., of N. Y.; L. B., of Conn.; S. J. S., of N. Y.; G. C. R., of N. Y.; O. C. S., of Mass.; P. J. C., of Conn.; W. W., of Mich.; A. S., of Conn.; A. C., of Vt.; E. and C. A., of Ohio; M. A. D., of Mich.; G. and V. of N. Y.; J. W. B., of Ind.; F. W. H., of C. E.; J. and D. S., of Wis.; R. B., of Cal.; D. C. S., of Conn.; J. C. H., of Mass.; P. D., of N. Y.; W. D. G., of Va.; H. G. H., of Ind.; H. B. S., of Ill.; S. L., of N. J.; D. D. C., of Mass.; P. and P., of Ill.; G. W. C., of Ill.; J. G., of Conn.; J. R., of Minn.; M. B. W., of Conn.; J. Van D., of N. Y.; J. W. Jr., of Ky.


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VALUABLE DOCK PROPERTY FOR SALE.—THE subscriber offers for sale a valuable plot of ground on Newtown Creek, near Penny Bridge, in the city of Brooklyn. The property is very desirably situated in the Seventeenth Ward, Meeker avenue, a great thoroughfare, forming the southerly boundary of the premises. A valuable dock privilege of over 400 feet on Newtown Creek, renders the property very desirable for large manufacturing or storage purposes. Vessels of six or eight feet draft can navigate the creek at low tide, and of much greater capacity at high water. The upland and water privilege comprise about nineteen acres, and will be sold very cheap, and the terms of payment made liberal. For further particulars, address J. B. BULLOCK, attorney for the owners, No. 39 Nassau street, New York. 22tf

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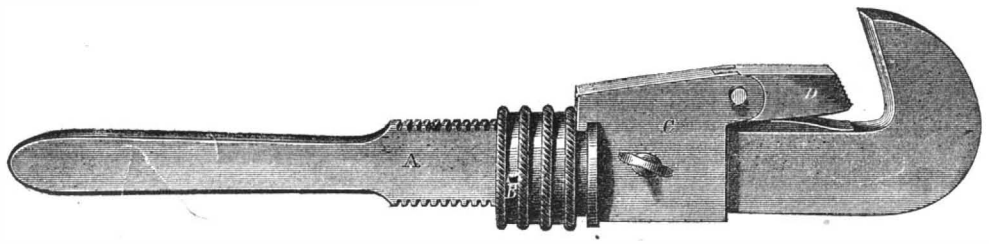
### Improved Patent Wrench.

Great difficulties have been encountered by machinists and others in obtaining a wrench that would fit irregular forms or accommodate itself to circular work. The common screw wrench cannot be used except on objects whose surfaces are parallel or at right angles with each other. The wrench here illustrated can be used for a variety of purposes, but it is intended more particularly for gas-fitters and those who employ the tongs now generally used for that purpose. The invention consists of the wrought-iron bar, A, having a hawk-bill head on one end and the handle on the other; in the center there is a square thread formed, upon which the nut, B, plays. The slide block, C, has a projection at one



KEARNEY'S PATENT WRENCH.

end which works in the groove prepared for it in the nut, B. The toggle, D, is jointed to the slide block and has a spring on one side to keep it in the right position with reference to the work. The end of the toggle is serrated or toothed, so that it will nip the work more firmly and prevent it from slipping when force is applied to the handle of the tool. When necessary the pin can be driven out of the toggle and its position reversed, thereby accommodating itself to all kinds of work. These wrenches can be made of either steel or iron.

This invention was patented through the Scientific American Patent Agency on Nov. 6, 1860, by W. M. Kearney, of Belleville, N. J., and further information can be had by addressing him at that place.

### Honey.

That delicious product of the busy bee—honey—commands at the present time the very modest sum of thirty cents per pound, and is not very good at that. A Mr. Kidder, of Vermont, a very successful bee-raiser, thus dilates in the *Prairie Farmer* upon the necessity of giving attention to this matter and the good results likely to ensue by so doing :—

"If the bee-keeper is skilled in the management of his bees, and has a hive rightly constructed, and the season is a favorable one, it is not an uncommon thing for him to realize ten, and in many instances, fifteen and twenty dollars profit from each prosperous hive yearly, thus paying three or four hundred per cent on the investment.

"There seems never to have been a time, since our earliest history, when bee-culture should demand our attention more than at the present, when, through war and heavy taxation, the great scarcity and high price of sugar are staring us in the face, I say why should we not encourage the culture of the bee upon a more extended scale and raise honey by the quantity, as some few now do; thus enabling us to meet the heavy taxes and affording us a handsome income besides? With right care and management and a favorable season, it will require but a few swarms of bees to raise a tun of honey. If a colony of bees comes out strong in the spring (as they will if properly wintered), it is an easy matter to realize 50 and 75 pounds [from them?], and sometimes much more; besides a young swarm, which will be thrown off, if properly attended to.

"Good honey readily commands a high price in market, and probably will for years to come. Under the present condition of our country and the high price of sugar, it certainly behooves us to live as much as possible within ourselves, independent of the South. There is honey enough wast d every year to supply us with all the sweets we need. If we had the bees to collect it, there could be more honey produced north of Mason's & Dixon's Line than there ever was sugar south of it, and it would not cost the producer one half what sugar now costs the Southern planter. There is no place in the world so well adapted to a large yield of honey as the northern portion of the United States, with its fertile hills, valleys and broad-spread prairies of the West. Certainly, for amount and quality of honey, we stand at the head of any other country in the world, if we would but improve it.

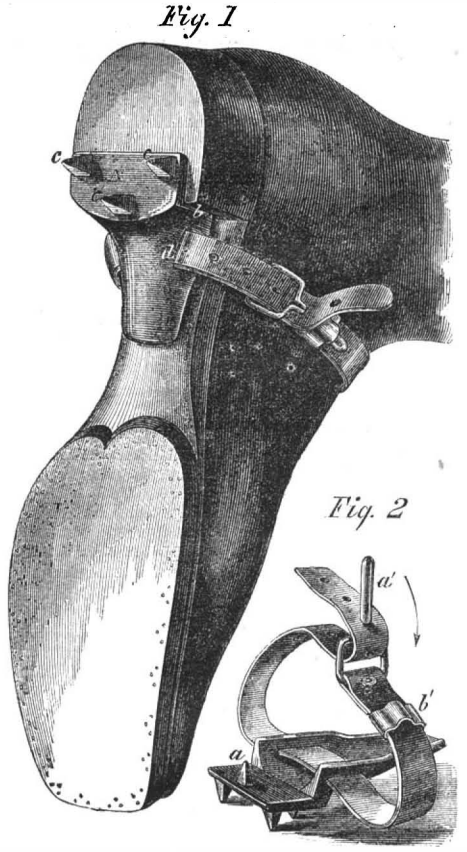
"There is no danger of over-stocking our market with honey, as the consumers increase faster than the producers. There is no danger of over-stocking our country with bees, as some persons have imagined, especially the fertile portions of it, as all honey-producing plants yield their sweets for days together and sometimes weeks; the time depending much upon the state of the weather and the species of flower.

"Those about to engage in the culture of this little insect should first get posted by consulting some scientific bee-keeper, or be guided by some good book upon the subject, to insure success in the business."

### BAILEY'S PATENT ICE-CREEPER.

The accompanying engraving is an illustration of a simple and useful instrument for securing a firm foothold on ice or slippery ground. It consists of

*Fig. 1*




the metal plate, A, with a shank on it; the shank conforms to the shape of the boot sole on which it sits. The inner end of the plate has a spur, *a* (Fig. 2), which penetrates the heel of the boot or shoe, and, in connection with the square shoulder, *b*, prevents the creeper from being detached or slipping out of place. On the outside of the plate there are three sharp points, *c c c*, which pierce the ice or snow on which the pedestrian may be promenading, and secure his person from any sudden change of base. The slots, *d*, in the shank of the creeper furnish a convenient point for the attachment of the straps by which the instrument is bound to the foot.

Fig. 2 is a view of the creeper detached from the boot and laid open to the inspection of the reader. The buckle by which the creeper is fastened to the foot deserves notice. The end of the strap is pushed through the usual opening and then looped over the tongue, $a^1$; the tongue is then pushed down on the body of the strap in the direction shown by the arrows; the clasp, $b'$, may then be slipped upon it and will hold it securely, as shown in Fig. 1.

The creeper is made of chilled iron, is light and easily applied. This ice-creeper has been in use for the past two winters and is said to have given satisfaction to the purchasers. The creeper and buckle were patented April 8, 1862, by G. L. Bailey, of Portland, Maine. Both patents are for sale, and further information respecting them can be had by addressing the inventor as above.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FROM THE STEAM PRESS OF JOHN A GRAY

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